The NATIONAL GEOGRAPHIC MAGAZINE

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HYDROGRAPHIC OFFICE

Chart of the World on

Speed per hour with daily and weekly distances in nautical miles					
8	*knots an hour*	192	*miles a day or*	1344	*miles a week*
9	"	216	"	1512	"
10	"	240	"	1680	"
11	"	264	"	1848	"
12	"	288	"	2016	"
13	"	312	"	2184	"
14	"	336	"	2352	"
15	"	360	"	2520	"
16	"	384	"	2688	"
17	"	408	"	2856	"
18	"	432	"	3024	"
19	"	456	"	3192	"
20	"	480	"	3360	"
21	"	504	"	3528	"
22	"	528	"	3696	"

Reduction of Knots or Nautical Miles to Statute Miles			
Nautical Miles	*Statute Miles*	*Nautical Miles*	*Statute Miles*
100	115.1565	10	11.5156
90	103.6408	9	10.3641
80	92.1252	8	9.2125
70	80.6096	7	8.0610
60	69.0939	6	6.9094
50	57.5782	5	5.7578
40	46.0626	4	4.6063
30	34.5470	3	3.4547
20	23.0313	2	2.3031
10	11.5156	1	1.1516

100° 110° 120° 130° 140° 150° 160° 170° 180° 170° 160°

70° 60° 50° 40°

WRANGELL I.
Icy C.
C Lisburne
Kotzebue Sd
East C
C Pr of Wales
BERING STRAIT
GULF OF ANADYR
C Nome
NORTON SOUND
St Michael
St Lawrence I
C Navarin
St Matthew I
Nunivak I
Yukon R.
C Olintorsk
Karaginski I
BERING SEA
Kuskokwim R.
C Ozerni
Pribilof Is
C Kamchatka
Komandorski Is
C Kronotzkoi
PETROPAVLOVSK — UNALASKA 1250
DUTCH HARBOR
C Shipunski
Near Is
ALEUTIAN ISLANDS
Unimak
Unalaska
Petropavlovsk
Rat Is
Andreanof Is
C Lopatka
KAMCHATKA
KURIL ISLANDS
OKHOTSK SEA
Nikolaevsk
Alexandrovsk
Alexandrovsk Rd
Ryvkonskoie
SAKHALIN I
Irkutsk
CHINESE EMPIRE
Harbin
Mukden
Niuchwang
Vladivostok
Soya
Rurumo
Iwanai
Muroran
Hakodate
Nemuro
Esashi
Fukuyama
Aomori
Hashinohe
Kamaishi
Akita
Sakata
Sendai
Kanazawa
Nagata
SEA OF JAPAN
PEKIN
Tientsin
Port Arthur
Hwangtu
SOUL
HAKODATE — UNALASKA 2240
YOKOHAMA TO UNALASKA 2551
YOKOHAMA TO PORT TOWNSEND 4740
YOKOHAMA TO PORT TOWNSEND 5920
MANILA TO PORT TOWNSEND 6240
YOKOHAMA TO SAN FRANCISCO 4526
MANILA TO SAN FRANCISCO 6241
PANAMA — YOKOHAMA 7650
PETROPAVLOVSK — MIDWAY IS 3645
UNALASKA — SITKA
DUTCH HR
MIDWAY IS
PORT TOWNSEND TO YOKOHAMA 4575 TO SHANGHAI 5625 TO HONGKONG 6165 TO SINGAPORE 7531 TO CALCUTTA 9161

XUM

Chart of the World on Mercator's Projection, showing St

160° 170° 180° 170° 160° 150° 140° 130° 120° 110° 100°

WRANGELL I.
Pt. Barrow
C. Bathurst
C. Lisburne
Icy C.
VICTORIA LAND
Kotzebue Sd.
East C.
C. Pr. of Wales
BERING STRAIT
Ft. Yukon
ALASKA
Ft. Egbert
GULF OF ANADYR
C. Nome
NORTON SOUND
St. Michaels
Dawson City
St. Lawrence I.
Yukon R.
Ft. Selkirk
C. Navarin
St. Matthew I.
Nunivak I.
Valdez
C. Olintorsk
Kara inski I.
BERING SEA
Kuskokwim B.
Bristol Bay
Yakutat B.
Juneau
C. Ozernui
Pribilof Is.
ALASKA PENA
KAMCHATKA
C. Kamchatka
Komandorski
C. Kronotzkoi
UNALASKA – SITKA 1105 – PORT TOWNSEND – KADIAK – ST. PAUL
PETROPAVLOVSK – UNALASKA 1250
DUTCH HARBOR
C. Shipunski
Near Is.
ALEUTIAN ISLANDS
UNALASKA – PORT TOWNSEND 1686
QUEEN CHARLOTTE IS.
Petropavlovsk
Attu I.
Andreanof Is.
C. Lopatka
HAKODATE – UNALASKA 2551
YOKOHAMA TO UNALASKA 2240
SAN FRANCISCO – UNALASKA 2035
YOKOHAMA TO PORT TOWNSEND 4740
YOKOHAMA TO PORT TOWNSEND 5320
YOKOHAMA TO SAN FRANCISCO 4536
MANILA TO PORT TOWNSEND 6361
MANILA TO SAN FRANCISCO 6361
PANAMA – YOKOHAMA 7650
PETROPAVLOVSK – UNALASKA 1645
MIDWAY IS. – SITKA 2660
PORT TOWNSEND 2775
HONOLULU – SITKA 2795
PORT TOWNSEND – SAN FRANCISCO 812
SAN FRANCISCO – SITKA 3262
PORT TOWNSEND – YOKOHAMA 4575 TO SHANGHAI 5625 TO HONGKONG 6165 TO SINGAPORE 7621 TO CALCUTTA 9161
MIDWAY IS. – SAN FRANCISCO 2770
Empire City
Eureka
Salt Lake City
Denver
Oakland
P. Townsend
Seattle
Tacoma
Olympia
Astoria
Portland
Vancouver
New Westminster
Whatcom
Victoria
Nanaimo
Alberni
Comox
Pt. Simpson
Metlakatla
Ketchikan
Wrangell
Sitka
Juneau
Yakutat
Valdez
Kodiak
St. Paul
Unalaska
Attu
Petropavlovsk
Yokohama
Hakodate
Manila
Honolulu
Midway Is.
Panama
Shanghai
Hongkong
Singapore
Calcutta
Port Townsend
San Francisco
Unalaska
Sitka
Kadiak
Dutch Harbor
Near Is.
Andreanof Is.
Rat Is.
Nunivak I.
St. Matthew I.
St. Lawrence I.
Navarin
Olintorsk
Kara inski I.
Ozernui
Kamchatka
Komandorski
Kronotzkoi
Shipunski
Lopatka
Pribilof Is.
Kuskokwim B.
Bristol Bay
Yukon R.
Kotzebue Sd.
Icy C.
Lisburne
Barrow
Bathurst
Wrangell I.
Ft. Yukon
Ft. Egbert
Dawson City
Ft. Selkirk
Juneau
Valdez
Yakutat B.
Rachel Island
Cook Islet
Kadiak I.
Unimak
Unalaska
Attu I.

s Projection, showing Submarine Cables and Connections, a

130° 120° 110° 100° 90° 80° 70° 60° 50° 40° 30°

C. Bathurst
VICTORIA LAND
BOOTHIA
COCKBURN I.
MELVILLE PEN.A
SOUTHAMPTON I.
WILLIAMS LD.
N. GALLOWAY
N. AYR
DAVIS STRAIT
FOX LAND
CUMBERLAND
Disko
GREENLAND
LIVERPOOL-DISKO 2160
DENM
Dawson City
Ft. Selkirk
Juneau
HUDSON BAY
Nelson
LIVERPOOL-PNELSON 3000
LIVERPOOL-IVIGT
QUEEN CHARLOTTE IS
Queen Charlotte Sd.
QUEBEC-LIVERPOOL 2600
GRACE CWRATH 1836
QUEBEC-PLYMOUTH 2620
Chateau R.
Belle Isle
Mingan
Seguenay R.
Romaine R.
Pointe de Monts
Tilt Cove
Gaspe
Antigosti
Tadoussac
Dalhousie
GULF OF ST LAWRENCE
NEW FOUNDLAND
Heart's Content
St Johns
Quebec
Amherst
St Paul I.
Sydney
Canso
Perry
NORTHERN ROUTES
QUEENSTOWN TO NEW YORK 2883
QUEENSTOWN 3015 TO LIVERP
SANDY HOOK TO NEW YORK 3053
SANDY HOOK TO FASTNET 2755
SANDY HOOK TO BISHOPS ROCK 2884
NY TO PLYMOUTH 3000
FASTNET TO SANDY HOOK 2840
NY TO QUEENSTOWN 2977
NEW YORK ROUTES
LIVERPOOL TO NEW YORK 3053
LIVERPOOL TO BOSTON 2837
QUEENSTOWN TO NY 2936
SANDY HOOK TO BISHOPS ROCK 2996
LIVERPOOL TO NY 3156
GIBRALTAR TO NEW YORK
GIBRALTAR TO NEW YORK 3204
NEW YORK TO GIBRALTAR 3215
NEW YORK - FAYAL 2098
AZORES
Halifax
Portland
Boston
Rye Beach
Duxbury
Albany
New Haven
New York
Philadelphia
Baltimore
Washington
Pittsburg
Cincinnati
Chicago
Milwaukee
Detroit
Toledo
Erie
L. SUPERIOR
L. MICHIGAN
L. HURON
L. ERIE
L. ONTARIO
Duluth
Toronto
Montreal
Belfast
Portland
Seattle
Tacoma
Olympia
Vancouver
Astoria
Portland
Empire City
Eureka
Salt Lake City
Denver
UNITED STATES
New Westminster
Whatcom
Nanaimo
Comox
P. Townsend
San Francisco
Sitka
Yokohama
Honolulu
Guam
Manila
Hong Kong
Amoy
Shanghai
Chefoo
Nagasaki
Possiet Bay
Vladivostock
Hakodate
Yezo
Otaru
Aniwa Bay
Yokohama
Kobe
Nagasaki
Shanghai
Hong Kong
Manila
Guam
Yap
Menado
Banka
Singapore
Penang
Rangoon
Madras
Bombay
Aden
Suez
Alexandria
Malta
Gibraltar
Lisbon
Fayal
Azores
Brest
Falmouth
Valentia
Liverpool
Penzance
Plymouth
Queenstown
Fastnet
Sandy Hook
Bishops Rock
Halifax
Sydney
Canso
Perry
Quebec
Montreal
Toronto
Belfast
Portland
Boston
Rye Beach
Duxbury
Albany
New Haven
New York
Philadelphia
Baltimore
Washington
Pittsburg
Cincinnati
Chicago
Milwaukee
Detroit
Toledo
Erie
Duluth
Seattle
Tacoma
Olympia
Vancouver
Astoria
Portland
Empire City
Eureka
Salt Lake City
Denver

Cables and Connections, and also Tracks for full-powered St

DISTANCES IN NAUTICAL MILES ALONG TRANSATLANTIC ROUTES BETWEEN	NORTHERN ROUTES		SOUTHERN ROUTES	
	EASTBOUND AUG 24-JAN 14	WESTBOUND AUG 15-JAN 14	EASTBOUND JAN 15-AUG 23	WESTBOUND JAN 15-AUG 14
SANDY HOOK LT. SHIP_FASTNET	2755	2728	2883	2840
" BISHOPS ROCK	2884	2857	2996	2955

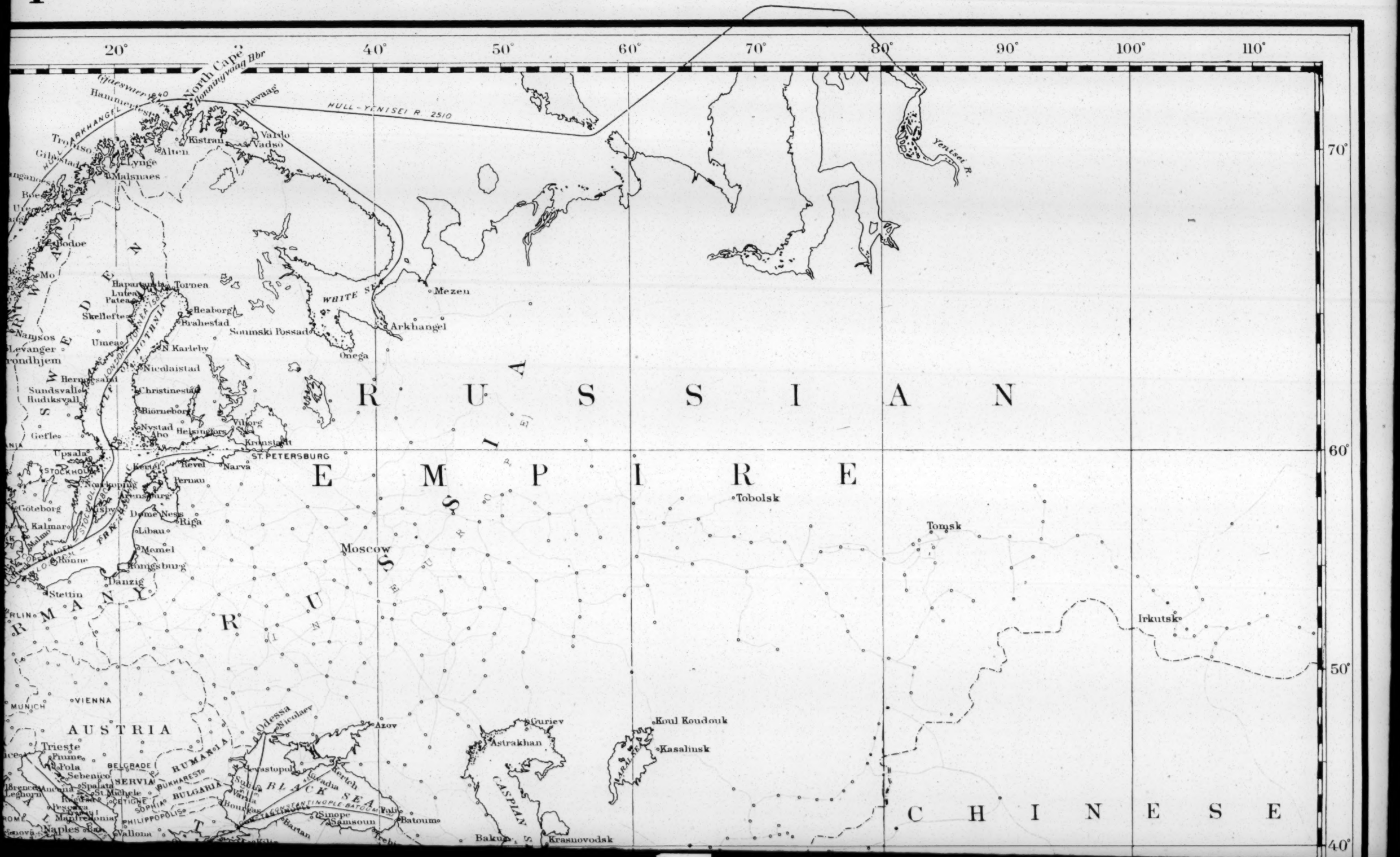
XUM

and also Tracks for full-powered Steam Vessels.

DISTANCES IN NAUTICAL MILES ALONG TRANSATLANTIC ROUTES BETWEEN	NORTHERN ROUTES		SOUTHERN ROUTES	
	EASTBOUND AUG 24-JAN 14	WESTBOUND AUG 15-JAN 14	EASTBOUND JAN 15-AUG 23	WESTBOUND JAN 15-AUG 14
SANDY HOOK LT. SHIP_FASTNET	2755	2728	2883	2840
" " BISHOPS ROCK	2884	2857	2996	2955

XUM

-powered Steam Vessels.



21	"	504	"	3528 "
22	"	528	"	3696 "

60° 50° 40° 30° 20° 10° 0°

OKHOTSK SEA
KAMCHATKA
KURIL ISLANDS
BERING SEA
ALEUTIAN ISLANDS
NORTH PACIFIC OCEAN
SEA OF JAPAN
CHINESE EMPIRE
KOREA
HONSIU
YEZO
NIPHON
RYUKYU ISLANDS
FORMOSA
PHILIPPINE IS
MINDANAO
SULU SEA
CELEBES SEA
BORNEO
CAROLINE ISLANDS
MARIANA OR LADRONE IS
MARSHALL IS
GILBERT IS
BONIN ISLES
VOLCANO ISLES
MIDWAY IS
HONOLULU
SAKHALIN I
PETROPAVLOVSK
DUTCH HARBOR
UNALASKA
SITKA
PEKIN
Tientsin
Harbin
Irkutsk
Vladivostok
Nemuro
Shanghai
Amoy
Canton
Hongkong
Manila
Bangkok
Singapore
Batavia
Yokohama
Nagasaki
Hakodate
Guam
Honolulu
Wake I
Midway Is
Palmyra I
Johnston I
Howland
Baker I
Nantucket
Tokyo
Kobe
Osaka
Nagoya
Sendai
Aomori
Akita
Sakata
Kanazawa
Fukui
Hashimoto
Kamaishi
Iwanai
Otaru
Esashi
Rumoi
Soya
Alexandrovsk
Nikolaevsk
Petropavlovsk
C. Lopatka
C. Olimborsk
C. Navarin
C. Kamchatka
C. Ozernoi
C. Kronotzkoi
C. Shipunski
Karaginski I
Komandorski
Near Is
Rat Is
Andreanof Is
Pribilof Is
St Matthew I
Nunivak I
Kuskokwim
Bristol Bay
Unimak
Unalaska
Dutch Harbor
Kiska
Attu
Lisianski I
Laysan I
Gardner
Necker I
Marcus I
Wake I
St Gaspar Rico
Enniwetok or Brown Group
Jaluit
Ualan
Jamestown Hr
Howland
Nantucket
Palmyra I
Washington I
Fanning I
Christmas I
Auckland
Levuka
Pago Pago
Honolulu
Yokohama
Midway Is
Hongkong
Manila
Guam
Sydney

BERING SEA
GULF OF ALASKA
NORTH PACIFIC OCEAN
UNITED STATES
MEXICO
HAWAIIAN IS
ALEUTIAN ISLANDS
MARSHALL IS
GILBERT IS
PHOENIX IS
LINE IS
GALAPAGOS IS
QUEEN CHARLOTTE IS
LOWER CALIFORNIA
GULF OF MEXICO
C. Olintorsk
Karaginski I
Ozernui
C. Kamchatka
Komandorski
Petropavlovsk
St. Matthew I
Nunivak I
Kuskokwim B
Bristol Bay
Pribilof Is
St. Paul
Kodiak I
Cook Inlet
Kachek Lak B
Valdez
Yakutat B
Sitka
Juneau
Dixon
Nelson
Unalaska
Dutch Harbor
Near Is
Rat Is
Andreanof Is
Umnak
Unimak
Kaniak
Alaska Pen
Shelikof St
Lisianski I
Laysan I
Gardner
Necker I
Honolulu
Hilo
Johnston I
Gaspar Rico
Jaluit
Bonham Is
Palmyra I
Washington I
Fanning I
Christmas I
Howland
Nantucket
Nonuti
Tahiti
Auckland
Pago Pago
Lexington
Suva
Apia
Callao
Lima
Arica
Iquique
Antofagasta
Valparaiso
Talcahuano
Juan Fernandez
Easter I
Pitcairn I
Tuamotu Arch
Marquesas Is
Samoa Is
Fiji Is
Tonga Is
Society Is
Cook Is
Tubuai Is
Ellice Is
Gilbert Is
Marshall Is
Caroline Is
Ladrone Is
Wake I
Midway Is
Hawaiian Is
Line Is
Phoenix

HUDSON BAY
Nelson
C A N A D A
Belle Isle
Tilt Cove
Point de Mont
Anticosti
Gaspe
Tadoussac
Dalhousie
Quebec
Montreal
Toronto
Duluth
L. SUPERIOR
L. MICHIGAN
L. HURON
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St. Pierre
Bear's Content
St. Johns
NEW FOUNDLAND
GULF OF ST. LAWRENCE
Romaine R
Mingan
Esquimaux R
Chateau R
MEXICO
GULF OF MEXICO
CARIBBEAN SEA
HONDURAS
TEGUCIGALPA
NICARAGUA
COSTA RICA
Blue Fields
Greytown
Limon
Chiriqui
Panama
Colon
Carthagena
Baranquilla
Maracaibo
Laweta
Cabello
CARACAS
Barcelona
Cumana
Guadeloupe
Martinique
St. Lucia
St. Vincent
Grenada
Barbados
Trinidad
Fernando
Tobago
Arguilla
Antigua
Dominica
St. Thomas
St. Croix
Jamaica
Kingston
Port Royal
Savanna la Mar
Montego Bay
St. Nicholas Mole
HAITI
Gonaives
Port au Prince
Aux Cayes
Jacmel
Santiago
Cuba
Puerto Rico
Mona Pass
Caicos Is
Turks Is
Inagua
Crooked I
Long I
Exuma
Nassau
Abaco
Bermuda
Graciosa
Terceira
San Jorge
Fayal
Pico
S. Miguel
COLOMBIA
BOGOTA
Buenaventura
Esmeraldas
QUITO
Guayaquil
ECUADOR
VENEZUELA
BRITISH GUIANA
DUTCH GUIANA
FRENCH GUIANA
Paramaribo
Surinam
Cayenne
Demerara
Berbice
Manaos
Santarem
Para
Maranham
Pernambuco
Ascension
St. Paul
St. Helena
Grande
Diago
C. VERDE IS
St. Vincent
Sierra Leone
Monrovia
Bissagos
Gambia R.
Konso R.
Sierra Leone
Funchal
Madeira
Canary Is
Palmas
Teneriffe
Fayal
Pico
S. Miguel
Graciosa
Terceira
San Jorge
Bermuda
Nassau
Abaco
Inagua
Crooked I
Long I
Exuma
Turks Is
Caicos Is
Mona Pass
Puerto Rico
Cuba
Santiago
Jacmel
Aux Cayes
Gonaives
Port au Prince
Jamaica
Kingston
Port Royal
Savanna la Mar
Montego Bay
St. Nicholas Mole
HAITI
Arguilla
Antigua
Dominica
Martinique
St. Lucia
St. Vincent
Grenada
Barbados
Trinidad
Fernando
Tobago

LIVERPOOL - IVIGTUT 1640
QUEBEC - LIVERPOOL 2600
C. RACE-C. WRATH 1836
C. RACE - TORY 1765
QUEBEC - PLYMOUTH 2620
NORTHERN ROUTES
NORTHERN ROUTES
NEW YORK - BORDEAUX 3187
NEW YORK TO PLYMOUTH 3120
NEW YORK TO HAVRE 3282
GIBRALTAR TO NEW YORK 3204
NEW YORK TO GIBRALTAR 3215
NEW YORK - FAYAL 2098
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BERMUDA TO GIBRALTAR 3030
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ST. THOMAS - FAYAL 2247
BARBADOS - LIVERPOOL 3705
BARBADOS - ST. VINCENT 2040
DEMERARA - FUNCHAL 2763
SIERRA LEONE TO BARBADOS 2730
BARBADOS TO SIERRA LEONE 2860
DEMERARA - SIERRA LEONE 2630
BARBADOS - PERNAMBUCO 2184
BARBADOS - RIO JANEIRO 1632
ASCENSION - SIERRA LEONE 1627
ASCENSION - C. CASTLE 1164
ASCENSION - FERNANDO PO 1567
ST. CASTLE 1286 PO 1567
ST. CASTLE 1286 PO 1486
ST. VINCENT - FUNCHAL 1070
ST. VINCENT - LAS PALMAS 876
ST. VINCENT - ST. HELENA
ST. VINCENT - ASCENSION 1227
BARBADOS - ST. HELENA
BARBADOS - ASCENSION
SIERRA LEONE 2975
PARA - ST. VINCENT 1772
PARA - FUNCHAL 2116
DEMERARA - ST. VINCENT 1015
KONGO R. 4437
AMAZON R. 1370
LAS PALMAS - LISBON 700
FUNCHAL - LISBON 537
FUNCHAL - PLYMOUTH 1345
LAS PALMAS - PLYMOUTH 1245
LAS PALMAS - LISBON 1190
GIBRALTAR - PLYMOUTH 1345
GIBRALTAR - LISBON 510
GIBRALTAR - MALTA 1060
MALTA - ALEXANDRIA 440
MALTA - PORT SAID 950
PORT SAID 1938
PLYMOUTH TO COLON 4540
BARBADOS - PLYMOUTH 3570
FAYAL - PLYMOUTH 1956
PLYMOUTH TO N.Y. 3079
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QUEENSTOWN TO LIVERPOOL 3079
QUEENSTOWN TO LIVERPOOL 3007
LIVERPOOL TO N.Y. 3156
LIVERPOOL TO NEW YORK 3053
FASTNET TO SANDY HOOK 2884
FASTNET TO QUEENSTOWN 2857
FASTNET TO SANDY HOOK 2840
SANDY HOOK TO BISHOPS ROCK 2884
SANDY HOOK TO FASTNET 3252
SANDY HOOK TO BISHOPS RK 3078
BISHOPS RK TO SANDY HOOK 2857
BISHOPS ROCK TO HAVRE 3120
QUEENSTOWN TO BISHOPS ROCK 2936
QUEENSTOWN TO BISHOPS ROCK 2884
LIVERPOOL TO BOSTON
BOSTON TO LIVERPOOL
Aug - Jan
Jan - Aug
June - Nov
June - Nov
ATLANTIC OCEAN
NORTH SEA
BRITISH ISLES
SCOTLAND
IRELAND
HEBRIDES
ORKNEY IS
SHETLAND IS
DENMARK
NETHERLANDS
BELGIUM
FRANCE
SPAIN
PORTUGAL
GERMANY
AUSTRIA
SWITZERLD
RUSSIA
ROUMANIA
SERVIA
BULGARIA
TURKEY
GREECE
ITALY
SICILY
SARDINIA
CORSICA
BALEARIC IS
BLACK SEA
MEDITERRANEAN SEA
ALGERIA (French)
TUNIS
TRIPOLI (Turkish)
FEZZAN
EGYPT
LIBYAN DESERT
NUBIAN DESERT
SAHARA
EL FALAT
(THE GREAT DESERT)
TIRIS (Spanish)
MOROCCO
FRENCH SOUDAN
SENEGAL (French)
GAMBIA
NIGER TERRITORIES (British)
KAMERUN (German)
LIBERIA (Indep.)
BRITISH GUIANA
DUTCH GUIANA
FRENCH GUIANA
VENEZUELA
BRITISH EAST AFRICA
GERMAN EAST AFRICA
KONGO FREE STATE
ABYSSINIA
ITALIAN NORTH
ERITREA
WADAY
DARFUR
ASHANTI
TOGO
DAHOMEY
ST. PETERSBURG
MOSCOW
BERLIN
VIENNA
MUNICH
BERNE
LONDON
PARIS
BRUSSELS
CHRISTIANIA
STOCKHOLM
CONSTANTINOPLE
BELGRADE
SOPHIA
BUKHAREST
PHILIPPOPOLIS
CAIRO
ALEXANDRIA
MADRID
LISBON
ROME
NAPLES
MARSEILLES
Halifax
Sydney
St. John's
Belle Isle
Cape Race
Anticosti
Gulf of St. Lawrence
Newfoundland
Bermuda
St. Thomas
Barbados
Trinidad
Grenada
St. Vincent
Martinique
Dominica
Antigua
Anguilla
Manaos
Santarem
Para
Pernambuco
Natal
Madeira
Canary Is
Tenerife
Palma
Gran Canaria
Cape Verde Is
St. Vincent
St. Paul
St. Helena
Ascension
Fernando Po
Princes I.
St. Thomas
Lopez
Corisco B.
Libreville
Kamerun
Lagos
Brass
Calabar
Grand Bassam
Cape Coast Castle
Accra
Sierra Leone
Bathurst
Bissao
Konakry
Los Is.
Freetown
Monrovia
Sierra Leone
Senegal
Gambia
Dakar
Goree
Fort Gaul
Timbuctoo
Kano
Zaria
Sokoto
Lagos
Benin
Bonny
Brass
Calabar
Kamerun
Gaboon
Loanda
Benguela
Mozambique
Zanzibar
Mombasa
Lamu
Melinda
Kabenda
Lith
Jidda
Sawakin
Massaua
Asab
Obokh
Suez
Port Said
Jerusalem
Beirut
Damascus
Yafa
Latakia
Adana
Smyrna
Rhodes
Candia
Sitia
Larnaka
Alexandria
Tripoli
Misrath
Djerba
Sfax
Sousa
Bizerta
Algiers
Oran
Melilla
Mogador
Tangier
Fez
Morocco
Arzila
Azov
Odessa
Nicolaev
Sevastopol
Kertch
Yenikale
Batoum
Trebizond
Sinope
Samsoun
Varna
Bourgas
Constantinople
Gallipoli
Dardanelles
Smyrna
Salonica
Athens
Corfu
Trieste
Venice
Fiume
Pola
Sebenico
Spalato
Ancona
Florence
Leghorn
Genoa
Turin
Milan
Bologna
Naples
Gaeta
Messina
Palermo
Catania
Syracuse
Cagliari
Bastia
Ajaccio
Palma
Barcelona
Tortosa
Valencia
Alicante
Cartagena
Almeria
Malaga
Gibraltar
Huelva
Cadiz
Oporto
Lisbon
Coimbra
Corunna
Ferrol
Gijon
Santander
St. Sebastian
Bayonne
Bordeaux
Rochelle
Nantes
St. Nazaire
Brest
Lorient
St. Malo
Cherbourg
Havre
Boulogne
Calais
Dover
Dartmouth
Penzance
Milford
Holyhead
Liverpool
Dublin
Wexford
Limerick
Galway
Sligo
Belfast
Londonderry
Carlisle
Newcastle
Edinburgh
Leith
Perth
Dundee
Aberdeen
Peterhead
Thurso
Stornoway
Kirkwall
Lerwick
Bergen
Christiansund
Drammen
Haugensund
Skiens
Arendal
Egersund
Christiansand
Upsala
Stockholm
Norrkoping
Jonkoping
Helsingborg
Malmo
Kalmaro
Carlscrona
Gothenburg
Hernosand
Gefle
Revel
Narva
Kronstadt
Libau
Memel
Konigsburg
Danzig
Stettin
Emden
Bremerhaven
Cuxhaven
Hamburg
Kiel
Flensburg
Riga
Dome Ness
Jernau
Ostend
Amsterdam
Rotterdam
Flushing
Ymuiden
Helder
Esquimaux B.
Romaine R.
Chateau B.
Mingan
Anticosti
Belle Isle
Cape Race
Heart's Content
St. John's
Amherst
St. Paul I.
Sydney
Canso
Halifax
Yarmouth
Portland
Boston
Sandy Hook
New York
Philadelphia
Baltimore
Norfolk
Charleston
Savannah
Jacksonville
Key West
Havana
Bermuda
Nassau
Turks I.
Jamaica
Kingston
Port Royal
Hayti
Porto Rico
St. Thomas
Anguilla
Antigua
Dominica
Martinique
St. Lucia
Barbados
Grenada
Trinidad
St. Fernando
Curaçoa
La Guayra
Puerto Cabello
Maracaibo
Savanilla
Carthagena
Aspinwall
Panama
Colon
Tobago
Demerara
Berbice
Surinam
Cayenne
Para
Manaos
Santarem
Pernambuco
Maceio
Bahia
Rio Janeiro
Santos
Montevideo
Buenos Ayres
Rosario
Bahia Blanca
Port Stanley
Falkland Is
Valparaiso
Coquimbo
Iquique
Arica
Callao
Payta
Guayaquil
Galapagos Is
Tumbez
Panama
Aspinwall
Jamaica
Kingston
Port Royal
Hayti
Porto Rico
Havana
Key West
Charleston
Savannah
Jacksonville
Norfolk
Baltimore
Philadelphia
New York
Sandy Hook
Boston
Portland
Yarmouth
Halifax
Sydney
St. John's
Heart's Content
Belle Isle
Cape Race
Anticosti
Gulf of St. Lawrence
Newfoundland

E M P I R E

RUSSIAN EMPIRE

C H I N E S E

EMPIRE

GERMANY

AUSTRIA

TURKEY

PERSIA

AFGHANISTAN

BRITISH INDIA

ARABIA

EGYPT

ABYSSINIA

ITALIAN NORTHEAST AFRICA

BRITISH EAST AFRICA

GERMAN EAST AFRICA

KONGO FREE STATE

(Belgian Protectorate)

KAMERUN (German)

FEZZAN

TRIPOLI (Turkish)

DESERT NUBIA

DARFUR

WADAY

BRITISH SOMALI

ERITREA

NEPAL

BHOTAN

CHINA

BORNEO

JAVA SEA

BAY OF BENGAL

ARABIAN SEA

CASPIAN SEA

BLACK SEA

MEDITERRANEAN SEA

Moscow

Tobolsk

Tomsk

Irkutsk

Canton

Stockholm

Petersburg

Revel

Narva

Riga

Memel

Danzig

Stettin

Berlin

Vienna

Munich

Trieste

Fiume

Pola

Belgrade

Servia

Bukharest

Rumania

Bulgaria

Sophia

Philippopolis

Varna

Odessa

Nicolaev

Azov

Sevastopol

Kertch

Yenikale

Kuban R.

Astrakhan

Guriev

Koul Koudouk

Kasalinsk

Aral Sea

Caspian Sea

Black Sea

Constantinople

Batoum

Sinope

Samsoun

Trebizond

Bakun

Krasnovodsk

Smyrna

Adana

Latakia

Rechf

Barfrouch

Teheran

Damascus

Beirut

Jerusalem

Yafa

El Arish

Suez

Cairo

Alexandria

Tripoli

Misrath

Malta

Candia

Rhodes

Sitia

Larnaca

Bushire

Lashak

Chahbar

Gwadar

Ormara

Sonmiyani

Karachi

Bhaunagar

Bombay

Maskat

Jidda

Lith

Kunfida

Sawakin

Massauah

Loheiya

Hodeida

Zubeit

Asab

Perim

Obokh

Adenese

Djibuti

Aden

Mocha

Socotra

Zanzibar

Melinda

Mombasa

Lamu

Mahé

Seychelles Is

Diego Garcia

Chagos Archgo

Laccadive Is

Maldive Is

Cape Comorin

Gulf of Manaar

Ceylon

Colombo

Negapatam

Pondicherry

Madras

Vizagapatam

Calcutta

Chittagong

Akyab

Rangoon

Moulmein

Diamond Is

Andaman Is

Nicobar Is

Penang

Singapore

Malacca

Acheen Hd

Medan

Benkulen

Padang

Batavia

Sourabaya

Bencoolen

Telok Betung

Banjermassing

Pontianak

Sarawak

Sadong

Labuan

Macao

Hongkong

Haifong

Namdinh

Vinh

Hue

Quangnam

Quangngai

Quinhin

Honcohe

Kiungchau

Tuchau

Pakhoi

Hainan

Bangkok

Kampot

Chantaboon

Cambodia

Cochin China

Siam

Gulf of Siam

Malay Peninsula

Sumatra

Java Sea

Torres Str.

Sunda Str.

Aden

Perim

Socotra

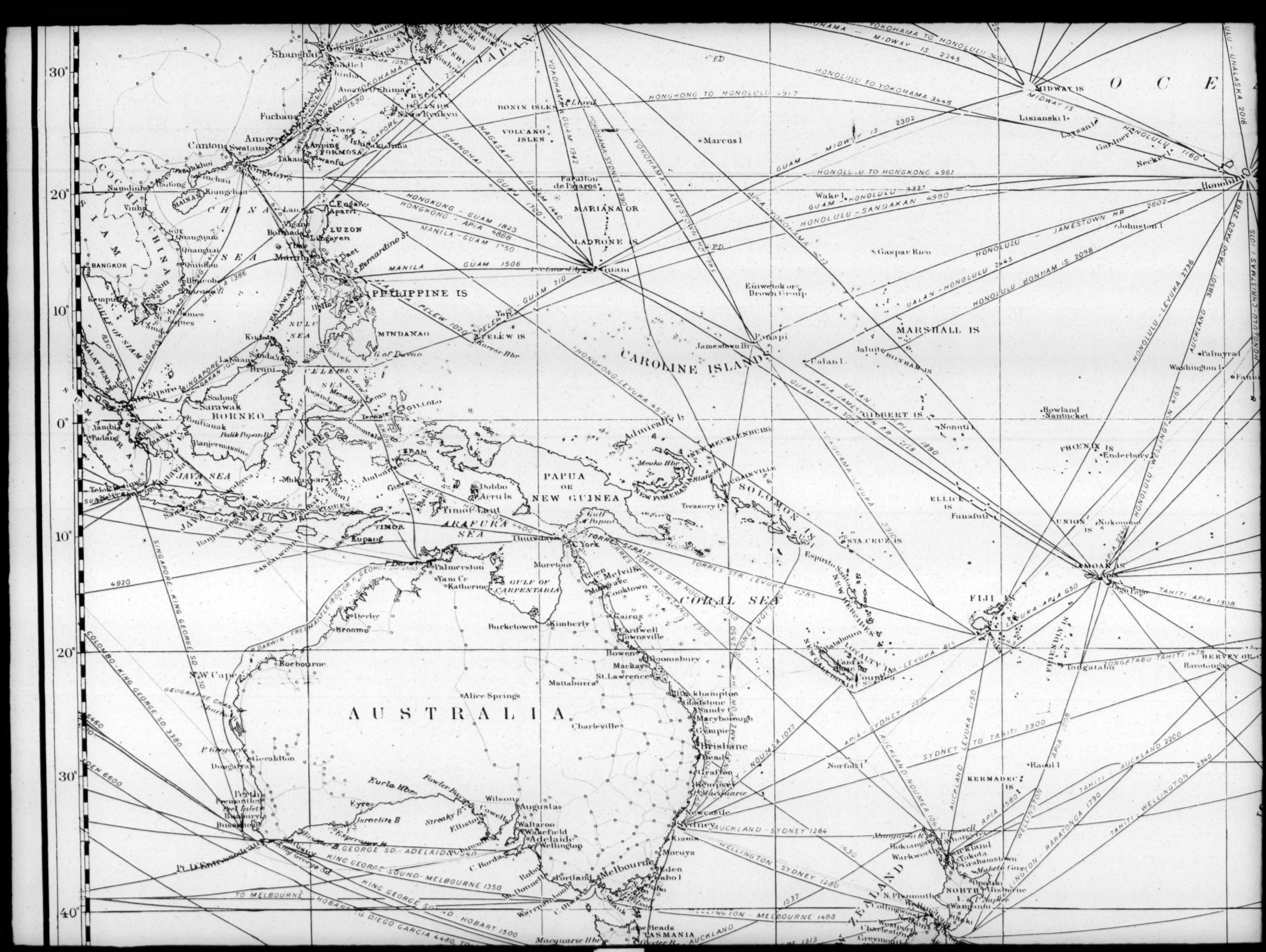
Zanzibar

Mahé

Diego Garcia

Chagos Archgo

Seychelles Is


OCEAN
CHINA SEA
PHILIPPINE IS
CAROLINE ISLANDS
MARSHALL IS
GILBERT IS
MARIANA OR LADRONE IS
BONIN ISLES
VOLCANO ISLES
RYUKYU ISLANDS
FORMOSA
LUZON
MINDANAO
PELEW IS
BORNEO
CELEBES SEA
JAVA SEA
SULU SEA
ARAFURA SEA
TIMOR
PAPUA OR NEW GUINEA
SOLOMON IS
CORAL SEA
AUSTRALIA
TASMANIA
NEW ZEALAND
NORTH I.
FIJI IS
SAMOA IS
TONGA IS
ELLICE IS
UNION IS
PHOENIX IS
MIDWAY IS
HONOLULU
Shanghai
Amoy
Canton
Swatow
Hongkong
Manila
Iloilo
Cebu
Zamboanga
Davao
Kuching
Sarawak
Brunei
Singapore
Bangkok
Saigon
Hue
Haiphong
Hainan
Kiungchau
Fuchau
Takao
Anping
Keelung
Ishigaki Jima
Naha Kyukyu
Amami O Shima
Saddle I
Hirado
Nagasaki
Yokohama
Kobe
Marcus I
Parallon de Pajaros
Agrihan
Pagan
Saipan
Guam
Rota
Yap
Koror Hbr
Ulithi
Truk
Ponape
Jamestown Hr
Jaluit
Calan I
Wake I
Johnston I
Lisianski I
Laysan I
Gardner
Necker I
Midway Is
Enewetok or Brown Group
S Gaspar Rico
Kusaie
Tarawa
Nonuti
Howland
Nantucket
Washington I
Palmyra I
Enderbury
Funafuti I
Nukumanu
Espiritu Santo
New Hebrides
Noumea
Loyalty Is
New Caledonia
Norfolk I
Raoul I
Kermadec Is
Tongatabu
Rarotonga
Papeete
Suva
Levuka
Auckland
Wellington
Lyttelton
Dunedin
Hokianga
Whangaroa
Auckland
Tokoda
Whangarei
Opotiki
Gisborne
N Plymouth
Wellington
Wanganui
Napier
Nelson
Westport
Greymouth
Christchurch
Timaru
Invercargill
Hobart
Launceston
Melbourne
Sydney
Newcastle
Brisbane
Townsville
Cairns
Thursday I
Torres Strait
Gulf of Carpentaria
Gulf of Papua
Admiralty Is
New Mecklenburg
New Pomerania
Bougainville
Treasury I
Mecko Hbr
Dobbo
Arru Is
Timor Laut
Kupang
Darwin
Port Essington
Palmerston
Yam Cr
Katherine
Moretone
Roben
Melville
Cooktown
Cairns
Gairus
Cardwell
Townsville
Bowen
Bloomsbury
Mackayl
St Lawrence
Mattaburra
Alice Springs
Charleville
Kimberly
Burketown
Broome
Derby
Roebourne
NW Cape
Geraldton
Dongara
Perth
Fremantle
Port Lincoln
Bunbury
Busselton
Albany
Eucla Hbr
Fowler Bay
Eyre
Israelite B
Streaky B
Wilson
Augusta
Cowell
Elliston
Waltaroo
Wakefield
Adelaide
Wellington
Port Pirie
Port Augusta
Spencer G
King George Sd
C Bordas
Robe
Portland
Melbourne
Moruya
Eden
Jervis B
Wollongong
Port Hacking
Botany B
Broken B
Port Stephens
Sydney
Newcastle
Kiama
Gabo I
Wilson's Prom
Warrnambool
Portland
Otway
Albany
Geographe Chan
Leeuwin
Naturaliste
Rottnest I
Fremantle
Port Gregory
Dongara
Darwin
Port Essington
Timor Laut
Arru Is
Dobbo
Amboina
Gisser
Mukassar
Tolo B
Sunda Str
Java
Sumatra
Malacca
Singapore
Malay Penin
Gulf of Siam
Pt Cambodia
Cape Varella
Hainan
Swatow
Amoy
Fuchau
Shanghai
Saddle I
Hirado
Nagasaki
Yokohama
Kobe
Naha Kyukyu
Amami O Shima
Ishigaki Jima
Keelung
Takao
Anping
Kelung
Swatow
Canton
Amoy
Fuchau
Shanghai
Hongkong
Manila
Iloilo
Cebu
Zamboanga
Davao
Kuching
Sarawak
Brunei
Singapore
Bangkok
Saigon
Hue
Haiphong
Hainan
Kiungchau
Vinh
Namdinh
Haitong
Swatow
Amoy
Canton
Hongkong
Manila
Iloilo
Cebu
Zamboanga
Davao
Kuching
Sarawak
Brunei
Singapore
Bangkok
Saigon
Hue
Haiphong
Hainan
Kiungchau
Vinh
Namdinh
Haitong
Swatow
Amoy
Fuchau
Shanghai
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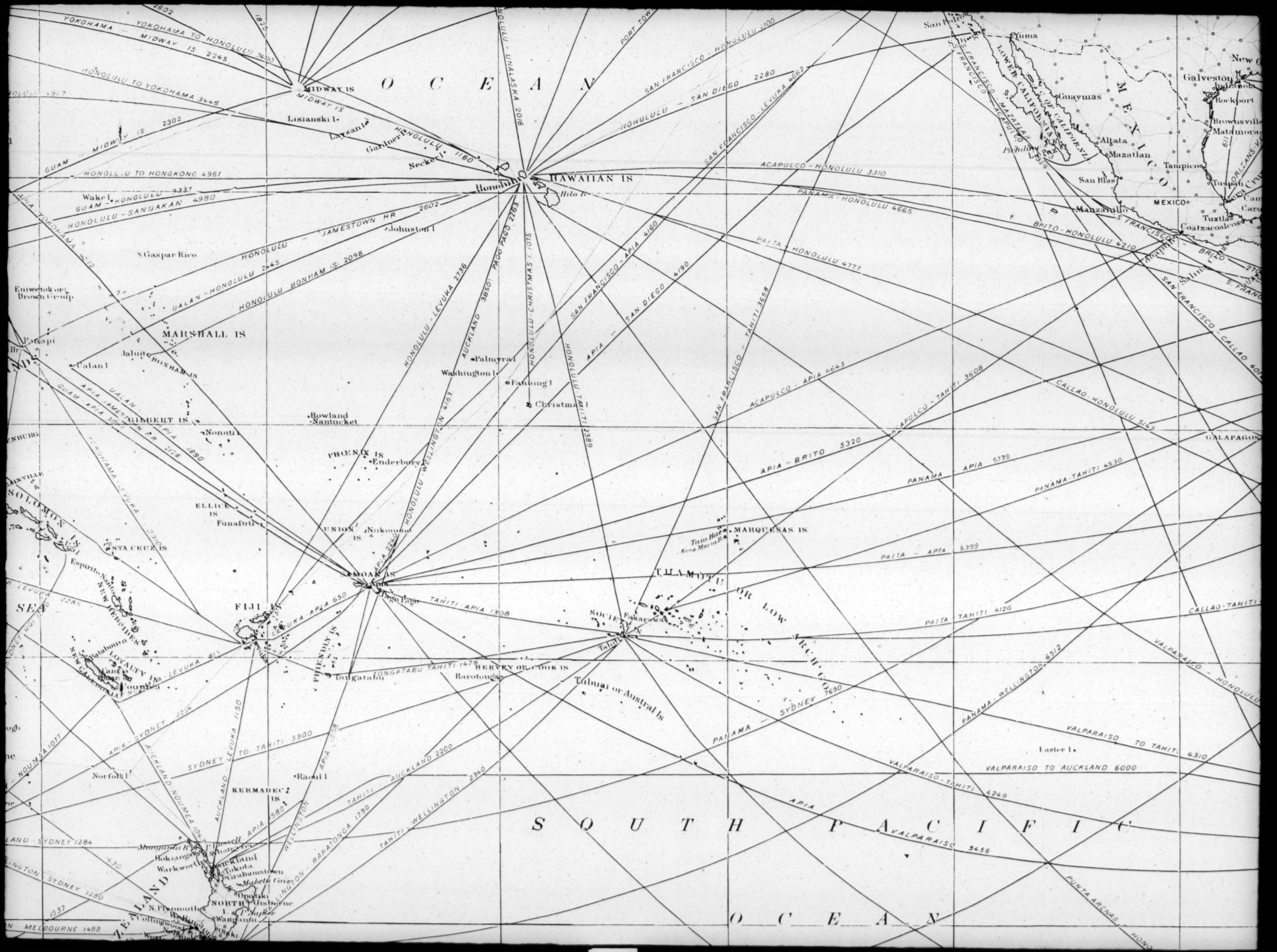
Naha Kyukyu
Amami O Shima
Ishigaki Jima
Keelung
Takao
Anping
Kelung
Swatow
Canton
Amoy
Fuchau
Shanghai


OCEAN
SOUTH PACIFIC
OCEAN
MEXICO
HAWAIIAN IS
Honolulu
MIDWAY IS
Lisianski I.
Laysan I.
Gardner
Necker I.
Wake I.
Johnston I.
S. Gaspar Rico
MARSHALL IS
Jaluit
Palmyra I.
Washington I.
Fanning I.
Christmas I.
Howland
Nantucket
Enderbury
PHOENIX IS
Nonuti
GILBERT IS
Ellice Is
Funafuti
UNION IS
Nukumanu
SAMOAN IS
Apia
FIJI IS
Suva
Levuka
Tongatabu
FRIENDLY IS
HERVEY OR COOK IS
Rarotonga
Tahiti
Papeete
SOCIETY IS
Fakarawa
TUAMOTU OR LOW ARCHIPELAGO
MARQUESAS IS
Taio Hae
Anna Maria B.
Tubuai or Austral Is
Easter I.
VALPARAISO
Norfolk I.
Raoul I.
KERMADEC IS
NEW ZEALAND
Auckland
Wellington
Napier
New Plymouth
Wanganui
Hokianga
Whangarei
Takuta
Grahamstown
Opotiki
Gisborne
Mt. Egmont
Mt. Ruapehu
Mt. Tongariro
Mt. Taranaki
Mt. Hikurangi

ATLANTIC OCEAN

PACIFIC OCEAN

MEXICO

GULF OF MEXICO

CARIBBEAN SEA

COLOMBIA

VENEZUELA

ECUADOR

PERU

BOLIVIA

BRAZIL

PARAGUAY

URUGUAY

ARGENTINA

GUIANA

HONDURAS

NICARAGUA

COSTA RICA

JAMAICA

HAITI

BRITISH

DUTCH

FRENCH

S. Luis Obispo
Sta Barbara
San Pedro
Yuma
Guaymas
Altata
Mazatlan
San Blas
Manzanillo
Tampico
Galveston
Rockport
Brownsville
Matamoras
New Orleans
Mobile
Pensacola
Wilmington
Charleston
Savannah
Brunswick
St Augustine
Tampa
Miami
Key West
Havana
Progreso
Sisal
Campêche
Carmen
Tuxtlas
Coatzacoalcos
Belize
Puerto Cortez
Truxillo
Bluefields
Greytown
Limon
Chiriqui
Panama
Punta Arenas
Barranquilla
Cartagena
Maracaibo
Laveta
Cabello
Caracas
Curaçao
Aruba
Trinidad
Tobago
Grenada
St Vincent
Barbados
Martinique
Dominica
Antigua
Anguilla
St Thomas
St Croix
St Christopher
Guadeloupe
Montserrat
Bermuda
Esmeraldas
Guayaquil
Sta. Elena
Paita
Casma
Callao
Lima
Pisco
Mollendo
Iquique
Tocopilla
Cobija
Antofagasta
Chañaral
Caldera
Carrizal Bajo
Guasco
La Serena
Coquimbo
Valparaiso
Santiago
Juan Fernandez
Talcahuano
Concepcion
Araucco
Lebu
Valdivia
Corral
Ancud
Chiloe
Puerto Montt
Manaos
Santarem
Para
Maranhão
Ceara
Natal
Maceio
Aracaju
Bahia
Ilheos
Caravellas
Victoria
Rio de Janeiro
Angra
Santos
Paranagua
Sta Catherina I.
Laguna
Torres
Rio Grande do Sul
Montevideo
Maldonado
La Plata
Buenos Aires
Asuncion
Corrientes
Rosario
Mendoza
Valparaiso
Pernambuco
Barbuda
Barbice
Paramaribo
Cayenne
Demerara
Sierra Leone
Monrovia
Funchal
Azores
Gibraltar
Palmas
Fayal
Plymouth
Royal
Liverpool
Baltimore
Newport News
New York
Halifax
Honolulu
Apia
Tahiti
Marquesas Is
Galapagos Is
Easter I.
Juan Fernandez
Sydney
Auckland
Wellington
Valparaiso
Callao
Panama
Acapulco
Manzanillo
Salina Cruz
San Francisco
Lower California
Pichilinque
La Paz
Mazatlan
Altata
Guaymas
Yuma
Tehuantepec
Puerto Barrios
Ruatan
Roatan
Swan Is
Navassa
Jamaica
Kingston
Port Royal
Savanna la Mar
Santiago de Cuba
Guantanamo
Cat Bo A
Matanzas
Habana
Key West
Tampa
Pensacola
Mobile
New Orleans
Galveston
Rockport
Brownsville
Matamoras
Tampico
Vera Cruz
Alvarado
Tuspan
Progreso
Sisal
Campêche
Carmen
Tuxtlas
Coatzacoalcos
Belize
Puerto Cortez
Truxillo
Bluefields
Greytown
Limon
Chiriqui
Panama
Punta Arenas
Barranquilla
Cartagena
Maracaibo
Laveta
Cabello
Caracas
Curaçao
Aruba
Trinidad
Tobago
Grenada
St Vincent
Barbados
Martinique
Dominica
Antigua
Anguilla
St Thomas
St Croix
St Christopher
Guadeloupe
Montserrat
Bermuda
Esmeraldas
Guayaquil
Sta. Elena
Paita
Casma
Callao
Lima
Pisco
Mollendo
Iquique
Tocopilla
Cobija
Antofagasta
Chañaral
Caldera
Carrizal Bajo
Guasco
La Serena
Coquimbo
Valparaiso
Santiago
Juan Fernandez
Talcahuano
Concepcion
Araucco
Lebu
Valdivia
Corral
Ancud
Chiloe
Puerto Montt
Manaos
Santarem
Para
Maranhão
Ceara
Natal
Maceio
Aracaju
Bahia
Ilheos
Caravellas
Victoria
Rio de Janeiro
Angra
Santos
Paranagua
Sta Catherina I.
Laguna
Torres
Rio Grande do Sul
Montevideo
Maldonado
La Plata
Buenos Aires
Asuncion
Corrientes
Rosario
Mendoza
Valparaiso
Pernambuco
Barbuda
Barbice
Paramaribo
Cayenne
Demerara
Sierra Leone
Monrovia
Funchal
Azores
Gibraltar
Palmas
Fayal
Plymouth
Royal
Liverpool
Baltimore
Newport News
New York
Halifax
Honolulu
Apia
Tahiti
Marquesas Is
Galapagos Is
Easter I.
Juan Fernandez
Sydney
Auckland
Wellington

ACAPULCO - HONOLULU 3310
PANAMA - HONOLULU 4665
BRITO - HONOLULU 4210
PAITA - HONOLULU 4777
SAN FRANCISCO - CALLAO 4012
ACAPULCO - APIA 4643
ACAPULCO - TAHITI 3908
CALLAO - HONOLULU 5167
APIA - BRITO 5320
PANAMA - APIA 6739
PANAMA - TAHITI 4530
PAITA - APIA 5399
PAITA - TAHITI 4126
CALLAO - TAHITI 4205
VALPARAISO - HONOLULU 5916
PANAMA - WELLINGTON 6512
VALPARAISO TO TAHITI 4310
VALPARAISO TO AUCKLAND 6000
VALPARAISO - TAHITI 4249
VALPARAISO 3456
SAN FRANCISCO - VALPARAISO 5140
PUNTA ARENAS - PANAMA 3932
PUNTA ARENAS TO SAN FRANCISCO 6199
SAN FRANCISCO - ACAPULCO 1227
SAN FRANCISCO - MAZATLAN 1227
SAN FRANCISCO - LEVUKA 4662
HONOLULU 2100
PANAMA - TAHITI 3658
ACAPULCO - TAHITI 3908
CALLAO - HONOLULU 5167
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NEW YORK - COLON 1227
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NEW YORK - CORINTO 1227
NEW YORK - PANAMA 2227
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NEW YORK - BERMUDA 1141
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RIO DE JANEIRO
PERNAMBUCO
AMAZON R.
ORINOCO R.
PARANA R.
URUGUAY R.
MAGDALENA R.
CAUCA R.
CANETE R.
ORINOCO R.
AMAZON R.
PARANA R.
URUGUAY R.
MAGDALENA R.
CAUCA R.
CANETE R.

XUM

ATLANTIC OCEAN

SOUTH ATLANTIC OCEAN

BRAZIL

VENEZUELA

COLOMBIA

ECUADOR

PERU

BOLIVIA

PARAGUAY

URUGUAY

ARGENTINA

BRITISH GUMANA

DUTCH GUMANA

FRENCH GUMANA

CARIBBEAN SEA

WEST INDIES

SAHARA EL FALATA

(THE GREAT DESERT)

MOROCCO

ALGERIA (French)

TRIPOLI (Turkish)

FEZZAN

TIRIS (Spanish)

CANARY IS

MADEIRA IS

AZORES

BERMUDA

FRENCH SOUDAN

NIGER TERRITORIES (British)

KAMERUN (German)

ANGOLA PORTUGUESE WEST AFRICA

GERMAN SOUTH-WEST AFRICA

DAMARA LAND

NAMAQUA LAND

BRITISH

FREE

KONGO

WADAY

TERU OR TIBESTI

SENEGAL (French)

GAMBIA

LIBERIA (Indep.)

ASHANTI

TOGO

DAHOMEY

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Baltimore

Philadelphia

Cincinnati

Newport News

Norfolk

Wilmington

Charleston

Savannah

Brunswick

St Augustine

Tampa

Miami

Key West

Pensacola

St Marks

P. Royale

Barranquilla

Cartagena

Maracaibo

Laveta

Caballos

CARACAS

Puerto Cabello

La Guaira

Curaçao

Trinidad

Grenada

St Vincent

Barbados

St Lucia

Martinique

Dominica

Guadeloupe

Antigua

Anguilla

St Thomas

Puerto Rico

St Nicholas Mole

HAITI

JAMAICA

Kingston

Port Royal

Savanilla

Santa Marta

Puerto Colombia

Maracaibo

Trujillo

HONDURAS

NICARAGUA

COSTA RICA

Panama

Colon

Greytown

Blue Fields

Bluefields

Porto Bello

Aspinwall

Chagres

Carthagena

Barranquilla

Laguayra

Puerto Cabello

Caracas

Trinidad

Fernando

Barbados

St Vincent

Grenada

Barbuda

Antigua

Anguilla

St Thomas

Puerto Rico

Dominica

Martinique

Guadeloupe

St Lucia

Barbados

Georgetown

Berbice

Paramaribo

Cayenne

Oyapoc

Para

Manaos

Santarem

Amazon R.

Maranhão

Natal

Fernambuco

Arabiba

Maceio

Aracaju

Bahia

Ilheos

Belmonte

Caravellas

Victoria

Rio de Janeiro

Santos

Paranaguá

Laguna

Torres

Rio Grande do Sul

Montevideo

Buenos Aires

Bahia Blanca

Valparaiso

Santiago

Coquimbo

Caldera

Chañaral

Antofagasta

Iquique

Arica

Tacna

Mollendo

Islay

Pisco

Callao

Lima

Chancay

Huacho

Huanchaco

Casma

Guayaquil

Sta. Elena

Esmeraldas

Quito

Buenaventura

Bogota

Santa Marta

Puerto Colombia

Maracaibo

Trujillo

Pta Rocha

Cadiz

Gibraltar

Tangier

Fez

Mequinez

Rabat

Casablanca

Mazagan

Mogador

Agadir

Melilla

Algiers

Oran

Bona

Tunis

Sousa

Sfax

Djerba

Gabes

Tripoli

Misrath

Malaga

Alicante

Valencia

Palma

Cartagena

Almeria

Huelva

Vila Real

Lisbon

Oporto

Figueira

Aveiro

Viana

Vigo

Coruña

Ferrol

Santander

Bilbao

Gijon

Corunna

Marseilles

Genoa

Leghorn

Naples

Palermo

Messina

Catania

Syracuse

Malta

Cagliari

Trapani

Madeira

Funchal

Porto Santo

Canary Is

Teneriffe

Palmas

Gran Canaria

Lanzarote

Arrecife

Fuerteventura

Cape Verde Is

Porto Praya

St Vincent

Grande

Fogo

Brava

Bissagos

Bathurst

Dakar

Goree

St Louis

Rio Nunez

Rio Pongo

Boffa

Boké

Benty

Forecariah

Sierra Leone

Freetown

Rio Pongas

Rio Nunez

Monrovia

Grand Bassam

Assinie

Elmina

Cape Coast Castle

Accra

Lagos

Porto Novo

Whydah

Benin

Brass

Bonny

Kamerun

Princes I. (Port)

Gabun

Corisco B.

Libreville

St Thomas (Port)

Lopez

Cabinda (Port)

Kongo R.

Loanda

Benguela

Mossamedes

C. Frio

Walfisch B.

St Helena

Ascension

Fernando Po

Trunidade

Abrolhos

Victoria

Espirito Santo

Rio de Janeiro

Sta Catherina I.

Iguape

Paranaguá

Cabo Frio

Ilheos

Bahia

Maceio

Natal

Fernambuco

Arabiba

Para

Manaos

Santarem

Amazon R.

Maranhão

Iquique

Arica

Tacna

Mollendo

Islay

Pisco

Callao

Lima

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Huacho

Huanchaco

Casma

Guayaquil

Sta. Elena

Esmeraldas

Quito

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Bogota

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Cadiz

Gibraltar

Tangier

Fez

Mequinez

Rabat

Casablanca

Mazagan

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Agadir

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Almeria

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Marseilles

Genoa

Leghorn

Naples

Palermo

Messina

Catania

Syracuse

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Trapani

Madeira

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Canary Is

Teneriffe

Palmas

Gran Canaria

Lanzarote

Arrecife

Fuerteventura

Cape Verde Is

Porto Praya

St Vincent

Grande

Fogo

Brava

Bissagos

Bathurst

Dakar

Goree

St Louis

Rio Nunez

Rio Pongo

Boffa

Boké

Benty

Forecariah

Sierra Leone

Freetown

Rio Pongas

Rio Nunez

Monrovia

Grand Bassam

Assinie

Elmina

Cape Coast Castle

Accra

Lagos

Porto Novo

Whydah

Benin

Brass

Bonny

Kamerun

Princes I. (Port)

Gabun

Corisco B.

Libreville

St Thomas (Port)

Lopez

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Iguape

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Bahia

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Natal

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Arabiba

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Manaos

Santarem

Amazon R.

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PERSIA

AFGHANISTAN

KABUL

NEPAL

BHUTAN

BRITISH INDIA

ARABIA

MEDITERRANEAN SEA

TRIPOLI

(Turkish)

FEZZAN

EGYPT

LIBYAN DESERT

NUBIA

FALATA

TERU OR TEDA

WADAY

DARFUR

ERITREA (Italy)

ABYSSINIA

ITALIAN NORTHEAST AFRICA

BRITISH SOMALI

ARABIAN SEA

BAY OF BENGAL

ANDAMAN IS

NICOBAR IS

CEYLON

LAKADIVE IS

MALDIVE IS

CHAGOS ARCHIPO

Diego Garcia

INDIAN OCEAN

KAMERUN (German)

KONGO FREE STATE (Belgian Protectorate)

BRITISH EAST AFRICA

GERMAN EAST AFRICA

ANGOLA PORTUGUESE WEST AFRICA

BRITISH CENTRAL AFRICA

EAST AFRICA (Port) OF MOZAMBIQUE

MADAGASCAR

Mauritius

Réunion

GERMAN SOUTH-WEST AFRICA

BRITISH BECHUANALAND

KALAHARI DESERT

TRANSVAAL

ORANGE RIVER COLONY

NATAL

CAPE COLONY

MATABELE LAND

DAMARA LAND

NAMAQUA LAND

STATE LAND

COCHIN CHINA

SIAM

CHINA

JAVA SEA

BORNEO

Naples

Vallona

Samsoun

Trebisond

Bakun

Krasnovodsk

Smyrna

Adana

Latakia

Rechd

Barfrouch

TEHERAN

Beirut

Damascus

Yafa

Jerusalem

Alexandria

CAIRO

Suez

El Arish

Said

Bushire

Jask

Chahbar

Gwadar

Pasni

Ormara

Sunmiyani

Karachi

Maskat

Yambo

Jidda

Lith

Kunfida

Sawakin

Massaua

Lohaiya

Hodeida

Zubeit

Aden

Obokh

Obbia

Lamu

Melinda

Mombasa

ZANZIBAR

Bagamoyo

Dar-es Salaam

Mikindani

Comoro Is

Mayotta

Diego Suarez

Nossi Be

Nambava

Mozambique

St Mary I

Tamatave

Tulear

St Dauphin

Durban

Cape Town

George

Port Nolloth

Walfisch B

Saya de Malha Bank

Rodriguez

Bombay

Bhaunagar

Calcutta

Balasore

Chittagong

Berhampore

Chicacole

Vizagapatam

Coconada

Masulipatam

Nellore

Madras

Pondicherry

Negapatam

Tranquebar

Cuddalore

Porto Novo

Beipur

Tellicherry

Cochin

Quilon

Nagercoil

Tuticorin

Jaffnapatam

Trincomali

Matticaloa

C. Comorin

Gulf of Manar

Columbo

Galle

C. de Galle

Acheen Hd

Penang

Malacca

Singapore

Medang

Singkel

Tapa Tuan

Benkalis

Jambi

Padang

Benkulen

Telok Betung

Batavia

Samarang

Soerabay

Banjuwangi

Bencoolen

Sadong

Sarawak

Pontianak

Banjermassing

Labuan

Cantong

Macao

Namdinho

Haifong

Kiungchan

Vinh

Quangnam

Quangngai

Quinhon

Hongkohe

Saigon

Bangkok

Moulmein

Rangoon

Diamond I

Basseins

Elephant Pt

Amherst

Tavoy

Sinhyoodin

Mergui

Ramree

Cheduba

Akyab

Sandoway

Chedooba

Negrais

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Rottnest I

Fremantle

Albany

Leeuwin C

Cape Leeuwin

Cape Chatham

Pt Nuyts

Kangaroo I

Spencer G

St Vincent G

Port Lincoln

Adelaide

Port Adelaide

Kingscote

Port Phillip

Melbourne

Hobart

Tasmania

Bass Str

Sydney

Port Jackson

Newcastle

Brisbane

Moreton B

Gt Sandy I

Port Denison

Gladstone

Keppel B

Rockhampton

Port Curtis

Broad Sd

Mackay

Cleveland B

Townsville

Port Denison

Halifax B

Cardwell

Hinchinbrook I

Cape Bedford

Cooktown

Cape Grafton

Cape Melville

Cape Flattery

Cape York

Torres Str

Thursday I

Prince of Wales I

Booby I

Raine I

Willis I

Lihou Reefs

Middle Reef

Wreck I

Frederick Reefs

Fairfax I

Lady Elliot I

Lady Musgrave I

Swain Reefs

Capricorn Is

Wilson I

Hunter I

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Sandy I

Willis I

Ashmore Reef

Cartier I

Scott Reef

Seringapatam Reef

Browse I

Adele I

Rowley Shoals

Barrow I

Montebello Is

Dampier Archipo

Lacepede Is

Bedout I

Direction I

Clerke Reef

Imperieuse Reef

Cossack

Roebuck B

Broome

Cape Leveque

Sunda Str

Java Head

Anjer

Batavia

Tanjong Priok

Samarang

Soerabay

Banjuwangi

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Diego Garcia

Saya de Malha Bank

Nazareth Bank

Rodriguez

Mauritius

Réunion

St Paul I

Amsterdam I

Kerguelen I

Heard I

Macdonald I

Prince Edward Is

Crozet Is

Marion I

Gough I

Tristan da Cunha

Inaccessible I

Nightingale I

Middle I

Stoltenhoff I

Tristan da Cunha

St Helena

Ascension

Fernando Noronha

Trinidade I

Martin Vaz Is

Rocas

St Peter & St Paul Rocks

Sombrero

Anguilla

St Martin

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St Eustatius

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Dominica

Martinique

St Lucia

St Vincent

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Barbados

Tobago

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Grenada

Aruba

Curaçao

Bonaire

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Blanquilla I

Orchila I

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Los Frailes Is

Los Hermanos

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Las Aves de Sotavento

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St Martin

St Barthelemy

Saba

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Les Saintes

Dominica

Martinique

St Lucia

St Vincent

Grenadines

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Los Roques Is

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Blanquilla I

Orchila I

Las Aves

Los Testigos

Los Frailes Is

Los Hermanos

La Tortola

Los Monjes Is

Las Aves de Barlovento

Las Aves de Sotavento

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ADEN - KARACHI 1450

ADEN - BOMBAY 1640

ADEN - BOMBAY 2590

BOMBAY - ADEN 2590

BOMBAY - COLOMBO 2130

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ADEN - KING GEORGE SD. 5140. MELBOURNE 5460

KING GEORGE SD. 4970 MELBOURNE 5320

COLOMBO - KING GEORGE SD. 3380

SINGAPORE - KING GEORGE SD. 2670

MAURITIUS - TORRES STRAIT 4920

DIEGO GARCIA - KING GEORGE SD. 3010

ADEN - KING GEORGE SD. 5140

MAURITIUS TO SUNDA STR. 2950 OR SINGAPORE

DIEGO GARCIA - SUNDA STR. 1980 OR SINGAPORE 2490

ADEN - SUNDA STRAIT 3750

ADEN 5970

TORRES STR.

SUNDA STR. 1770

COLOMBO 2200

COLOMBO - PENANG 1270 OR SINGAPORE

SINGAPORE 1630

CALCUTTA 680

MADRAS 1050

BANGOON 990

BANGOON 200

COLOMBO - RANGOON 1280

SINGAPORE - BANGKOK 1386

SINGAPORE - HONGKONG 1700

SINGAPORE - TANDJONG PRIOK 420

SINGAPORE - BATAVIA 1000

PENANG - RANGOON 700

PENANG - CALCUTTA 1100

PENANG - MADRAS 1000

PENANG - COLOMBO 700

PENANG - ACHEEN HD 200

PENANG - SINGAPORE 350

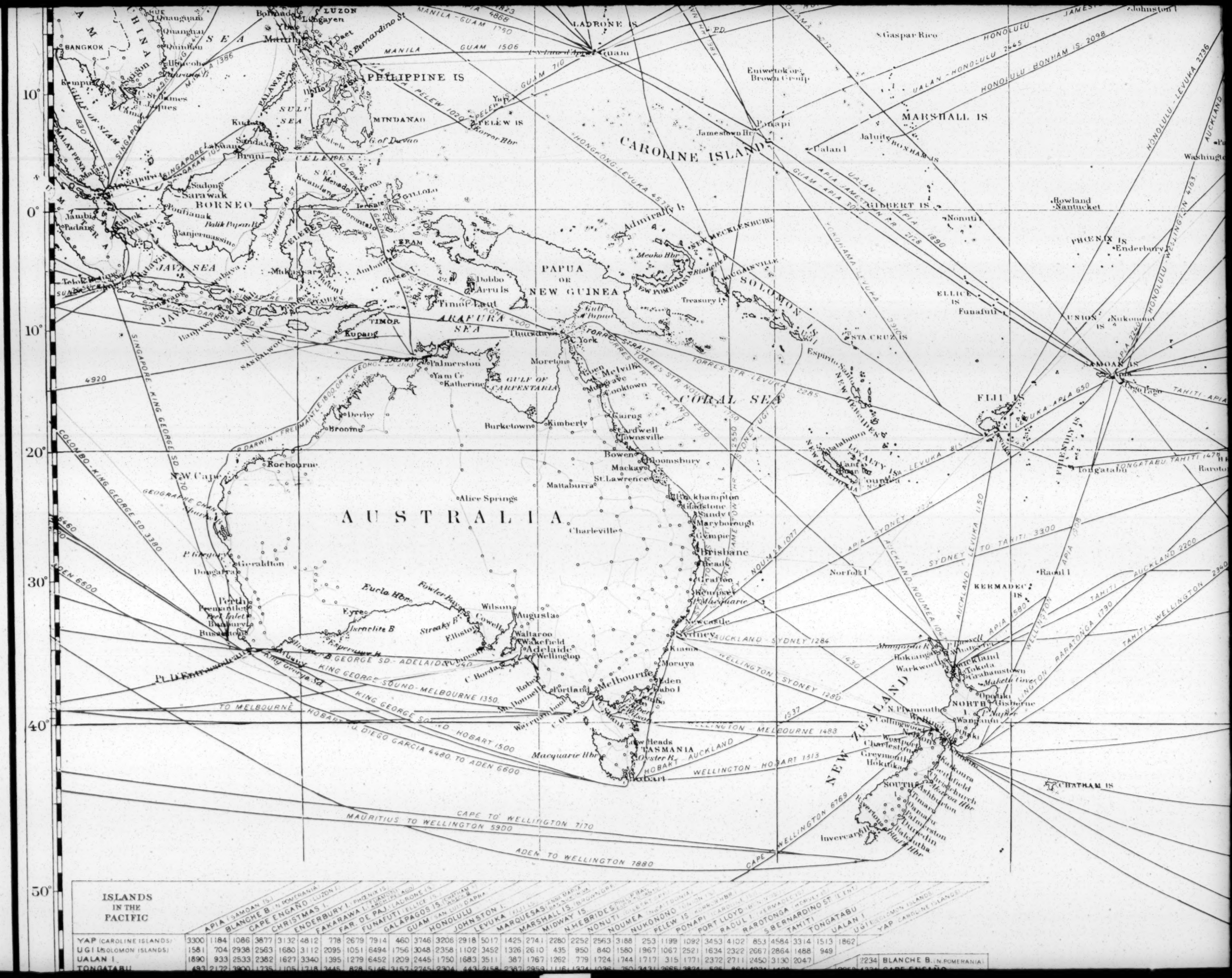
PENANG - MALACCA 200

PENANG - MERGUI 400

PENANG - AKYAB 1000

PENANG - CHITTAGONG 1100

PENANG - BALASORE 1200


PHILIPPINE IS
LUZON
MINDANAO
BORNEO
CELEBES
JAVA SEA
SULU SEA
CELEBES SEA
ARAFURA SEA
TIMOR SEA
CORAL SEA
TASMAN SEA
PAPUA OR NEW GUINEA
LADRONE IS
CAROLINE ISLANDS
PELEW IS
MARSHALL IS
GILBERT IS
PHOENIX IS
ELLICE IS
SOLOMON IS
NEW HEBRIDES
NEW CALEDONIA
LOYALTY IS
FIJI IS
SAMOA IS
UNION IS
TONGATABU
FRIENDLY IS
NEW ZEALAND
NORTH I.
SOUTH I.
CHATHAM IS
KERMADEC IS
NORFOLK I
AUSTRALIA
MANILA - GUAM 1750
MANILA GUAM 1506
GUAM 710
PELEW 1020
HONGKONG-LEVUKA 4570
SINGAPORE-GUAM 3830
SINGAPORE-KING GEORGE SD 3380
SINGAPORE-DARWIN 1800
DARWIN-FREMANTLE 1800
COLOMBO-KING GEORGE SD 5270
ADEN 6500
ADEN 6600
KING GEORGE SOUND-MELBOURNE 1350
KING GEORGE SOUND-HOBART 1500
KING GEORGE SD - ADELAIDE 540
D. DIEGO GARCIA 4480 TO ADEN 6600
CAPE TO WELLINGTON 7170
MAURITIUS TO WELLINGTON 5900
ADEN TO WELLINGTON 7880
WELLINGTON 6769
HONOLULU - JAMESTOWN
HONOLULU BONHAM IS 2098
UALAN - HONOLULU 2445
HONOLULU - LEVUKA 2736
HONOLULU WELLINGTON 4703
AUCKLAND - SYDNEY 1284
SYDNEY TO TAHITI 3300
AUCKLAND - NOUMEA 1077
AUCKLAND LEVUKA 1150
AUCKLAND 2200
TAHITI - AUCKLAND 2340
TAHITI - WELLINGTON 2340
WELLINGTON - SYDNEY 1290
WELLINGTON - MELBOURNE 1483
WELLINGTON - HOBART 1313
WELLINGTON - RAROTONGA 1790
WELLINGTON - APIA 1580
HOBART - AUCKLAND
TORRES STR - LEVUKA 2305
TORRES STRAIT
TORRES STR NOUMEA 2550
TORRES STR AUCKLAND 2570
APIA - SYDNEY 2228
APIA 1890
APIA 2240
APIA 1958
APIA - LEVUKA 815
LEVUKA APIA 650
LEVUKA 1150
TAHITI - APIA
TONGATABU TAHITI 1470
GUAM APIA 3010
UALAN - APIA 2128
UALAN - JAMESTOWN APIA 2128
HONOLULU - APIA 3240
HONOLULU - APIA 3240
HONGKONG - APIA 4570
HONGKONG - LEVUKA 4570
MANILA - APIA 4866
MANILA - APIA 4866
SINGAPORE - APIA 4866
SINGAPORE - APIA 4866
SINGAPORE - LEVUKA 4570
SINGAPORE - LEVUKA 4570
SINGAPORE - APIA 4866
SINGAPORE - APIA 4866
SINGAPORE - APIA 4866

S Gaspar Rico
Johnston I
HONOLULU – JAMESTOWN HR 2602
HONOLULU 2445
UALAN – HONOLULU 2445
HONOLULU RONHAM IS. 2098
MARSHALL IS
Jaluite
RONHAM IS
GILBERT IS
Nonouti
Howland
Nantucket
Palmyra I
Washington I
Fanning I
Christmas I
HONOLULU – LEVUKA 2736
AUCKLAND 3850 PAGO PAGO 2765
HONOLULU – CHRISTMAS I 1075
HONOLULU – WELLINGTON 4183
HONOLULU – TAHITI 2389
SAN FRANCISCO – APIA 4160
SAN FRANCISCO – SAN DIEGO 4190
APIA – SAN DIEGO
PHOENIX IS
Enderbury
ELLICE IS
Funafuti
UNION IS
Nukunonu
STA CRUZ IS
SAMOA IS
Apia
APIA 2240
Upolu
Tutuila
TAHITI – APIA 1308
FIJI IS
LEVUKA – APIA 650
Suva
Levuka
NEW HEBRIDES
LOYALTY IS
Lifu
Uea
Noumea
APIA – SYDNEY 2234
AUCKLAND – NOUMEA 1040
AUCKLAND – LEVUKA 1150
SYDNEY TO TAHITI 3300
FRIENDLY IS
Tongatabu
TONGATABU TAHITI 1475
HERVEY OR COOK IS
Rarotonga
Raoul I
KERMADEC IS
AUCKLAND 2200
APIA 1580
TAHITI – WELLINGTON 2340
WELLINGTON – RARATONGA 1730
TAHITI
Tubuai or Austral Is
PANAMA – SYDNEY 7690
HONOLULU 4665
PAITA – HONOLULU 4777
SAN FRANCISCO – TAHITI 3658
ACAPULCO – APIA 4643
ACAPULCO – TAHITI 3608
APIA – BRITO 5320
PANAMA – APIA 5739
PANAMA – TAHITI 4530
PAITA – APIA 5399
PAITA – TAHITI 4126
MARQUESAS IS
Taio Hae
Anna Maria B
TUAMOTU
OR LOW ARCHIPELAGO
SOCIETY IS
Papeete
Tahiti
MEXICO
Campêche
Carmen
Tuxtlas
Coatzacoalcos
Frontera
Belize
Manzanillo
BRITO – HONOLULU 4210
S FRANCISCO – BRITO 2760
ACAPULCO – PANAMA 3270
SAN FRANCISCO – CALLAO 4012
CALLAO – HONOLULU 5167
GALAPAGOS IS
Punta Arenas
CALLAO – TAHITI 4205
SAN FRANCISCO – VALPARAISO 6199
VALPARAISO – HONOLULU 5916
PUNTA ARENAS – HONOLULU 6379
PUNTA ARENAS – TAHITI 6224
PUNTA ARENAS – APIA 5197
PUNTA ARENAS – WELLINGTON 5039
VALPARAISO – WELLINGTON 6512
PANAMA – WELLINGTON 6512
VALPARAISO TO TAHITI 4310
VALPARAISO TO AUCKLAND 6000
VALPARAISO – TAHITI 4249
VALPARAISO 3456
Easter I.
PUNTA ARENAS TO SAN FRANCISCO 6199
WELLINGTON TO CALLAO 5700.
WELLINGTON TO VALPARAISO 5050
WELLINGTON TO CAPE PILLAR 4410
Better weather will, as a rule, be found along this track than further south
CHATHAM IS
NEW ZEALAND
N Plymouth
Wellington
Wanganui
Napier
Gisborne
Auckland
Hokianga
Warkworth
Takuta
Tauranga
Rotorua
Opotiki
Collingwood
Nelson
Westport
Greymouth
Charleston
Hokitika
Christchurch
Timaru
Oamaru
Dunedin
Invercargill
Bluff
SOUTH I.
NORTH I.
SOUTH PACIFIC OCEAN

MEXICO
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
COLOMBIA
VENEZUELA
CARIBBEAN SEA
HAITI
JAMAICA
ECUADOR
PERU
BOLIVIA
CHILE
ARGENTINA
BRAZIL
GUIANA
BRITISH
DUTCH
FRENCH
PARAGUAY
URUGUAY
Manzanillo
Campèche
Carmen
Tuxtla
Coatzacoalcos
Frontera
Belize
Puerto Cortez
Truxillo
Tecucigalpa
Bluefields
Greytown
Limon
Chiriqui
Colon
Panama
Puerto Bello
Savanilla
Cartagena
Baranquilla
Maracaibo
Laguaira
Caracas
Valencia
Puerto Cabello
Barcelona
Cumana
Carupano
Cariaco
Guiria
Trinidad
Fernando
Grenada
St Vincent
Barbados
Martinique
Dominica
Antigua
Anguilla
St Thomas
Kingston
Santiago
Port Royal
Cape Cruz
Cape Tiburon
Cape Maysi
Cape Antonio
Cape St Antonio
Cape St Lucas
Cape Corrientes
Cape Blanco
Cape Parina
Cape Pasado
Cape Blanco
Cape Pillar
Cape Horn
Cape Virgins
Cape Frio
Cape St Roque
Cape St Augustine
Cape St Francisco
Cape Corrientes
Cape Negro
Cape Verde Is
St Vincent
St Paul
Fo Noronha
Natal
Maceio
Aracaju
Bahia
Ilheos
Valencia
Camamu
Belmonte
P. Seguro
Caravellas
Sn. Matheo
Victoria
Itapemirim
Rio de Janeiro
Santos
Paranagua
Sta Catherina I.
Laguna
Torres
Conceicão do Arroio
Rio Grande do Sul
Maldonado
Montevideo
Buenos Aires
La Plata
Ensenada
Bahia Blanca
Rio Negro
Mar del Plata
Valparaiso
Santiago
Juan Fernandez
La Constitucion
Concepcion
Arauco
Lebu
Toltel
R. Imperial
Valdivia
Pto. Monte
Ancud
Chiloe I.
Chonos Archipelago
Tres Montes
Taitao Pen.
Gulf of Penas
Gulf of Trinidad
Gulf of Guayaquil
Gulf of Panama
Gulf of Nicoya
Gulf of Fonseca
Gulf of Tehuantepec
Gulf of Campèche
Gulf of Mexico
Gulf of Darien
Gulf of Venezuela
Gulf of Paria
Gulf of Maracaibo
Gulf of Guiria
Gulf of Cariaco
Gulf of Cumana
Gulf of Barcelona
Gulf of Pozuzo
Gulf of Ancon
Gulf of Callao
Gulf of Pisco
Gulf of Arica
Gulf of Iquique
Gulf of Mejillones
Gulf of Antofagasta
Gulf of Chañaral
Gulf of Caldera
Gulf of Carrizal Bajo
Gulf of Guasco
Gulf of La Serena
Gulf of Coquimbo
Gulf of Valparaiso
Gulf of Concepcion
Gulf of Arauco
Gulf of Lebu
Gulf of Toltel
Gulf of Valdivia
Gulf of Ancud
Gulf of Chiloe
Gulf of Tres Montes
Gulf of Taitao

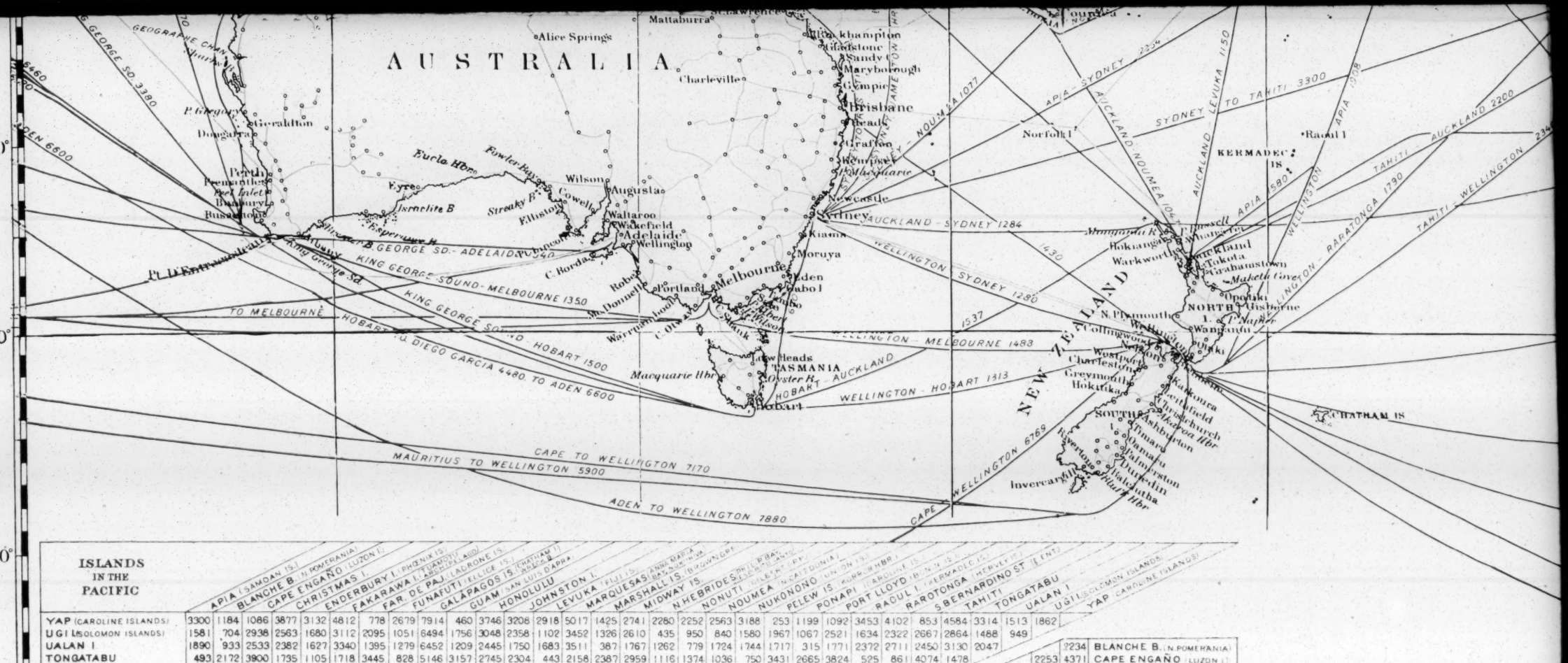
SAHARA EL FALAT
(THE GREAT DESERT)
(Spanish)
LIBYAN DESERT
NUBIA
TERU OR TEDA
WADAY
DARFUR
FRENCH SOUDAN
SENEGAL (French)
GAMBIA
PORT GUINEA
SIERRA LEONE (Br.)
LIBERIA (Indep.)
NIGER TERRITORIES (British)
ASHANTI
TOGO
DAHOMEY (F.)
KAMERUN (German)
Princes I. (Port.)
St. Thomas (Port.)
Lopez
KONGO FREE STATE (Belgian Protectorate)
GERMAN EAST AFRICA
BRITISH EAST AFRICA
ITALIAN N.
ERITREA (Ital.)
ABYSSINIA
Massaua
Sawakin
Jidda
ANGOLA PORTUGUESE WEST AFRICA
Benguela
Mossamedes
C. Frio
BRITISH CENTRAL AFRICA
EAST AFRICA PROTECTORATE
MOZAMBIQUE
MATABELE LAND
GERMAN SOUTH-WEST AFRICA
DAMARA LAND
GT. NAMAQUA LAND
BRIT. BECHUANA LAND
KALAHARI DESERT
SOUTH AFRICA
TRANSVAAL
ORANGE RIVER COLONY
NATAL
CAPE COLONY
Walfisch B.
P. Nolloth
Durban
George
Cape Town
C. of Good Hope
Algoa B.
Port Elizabeth
Algoa Bay
Table B.
Simon's Bay
Cape Agulhas
Aliwal North
Ladysmith
Newcastle
Pietermaritzburg
Kokstad
Umtata
Kimberley
Bloemfontein
Pretoria
Johannesburg
Lourenco Marques
Beira
Chinde
Quelimane
Tete
Zambesi R.
Kongo R.
Loanda
Kabinda
Boma
Banana
Landana
Cabinda
Fernando Po
Corisco B.
Libreville
Gaboon R.
Cape Coast Castle
Elmina
Accra
Lagos
Grand Bassam
Sierra Leone
Freetown
Los Is.
Rio Pongo
Bissagos
Bathurst
Dakar
C. Verde
St. Louis
Bolama
Bissao
Geba R.
Gambia R.
Casamance R.
Rio Grande
Bajuda I.
Madeira
Funchal
Canary Is.
Las Palmas
Teneriffe
Santa Cruz
Mogador
Tangier
Gibraltar
Malta
Tripoli
Benghazi
Alexandria
Suez
Aden
Jeddah
Massowah
Zanzibar
Mombasa
Lamu
Dar-es Salaam
Bagamoyo
Mikindani
Mozambique
Beira
Chinde
Quelimane
Tete
Zambesi R.
Durban
Natal
Mauritius
Madagascar
Reunion
Amsterdam I.
St. Paul
Fernando Noronha
Ascension
St. Helena
Tristan da Cunha
Marion I.
Cape Verde Is.
St. Vincent
St. Thomas
Anguilla
Antigua
Dominica
Martinique
St. Lucia
Barbados
Grenada
Trinidad
Tobago
Curaçao
Aruba
Bonaire
Margarita I.
Trinidad
Fernando
Georgetown
Demerara
Berbice
Paramaribo
Surinam
Cayenne
Maroni R.
Oyapock R.
Amazon R.
Para
Manaos
Santarem
Maranhão
Parnahiba
Pernambuco
Natal
Aracaju
Maceio
Bahia
Ilheos
Valencia
Camamu
Belmonte
Caravellas
Victoria
Rio de Janeiro
Sn. Matheo
P. Seguro
Trinidade
Rio Grande do Sul
Pelotas
Porto Alegre
Laguna
Sta Catherina I.
Paranagua
Iguape
Santos
Parati
Angra dos Reis
Victoria
Itapemirim
S. Joao da Barra
Montevideo
Maldonado
La Plata
Buenos Aires
Bahia Blanca
Mar del Plata
Rio Negro
Patagonia
Falkland Is.
Port Stanley
Cape Horn
Sucre
Bolivia
Paraguay
Asuncion
Uruguay
Argentina
Brazil
Guiana
Venezuela
Colombia
Peru
Ecuador
Chile
Atlantic Ocean
South Atlantic Ocean
Indian Ocean
Pacific Ocean
Barbados - Pernambuco 2184
Barbados - St. Vincent 2040
Barbados - Monrovia 2938
Barbados - Sierra Leone 2860
Barbados - St. Kongo R. 4437
Barbados - Ascension 2715
Barbados - St. Helena 3641
Bermuda - St. Vincent 2340
Demerara - Sierra Leone 2670
Demerara - Funchal 2769
Para - Funchal 2716
Para - St. Vincent 1715
Sierra Leone to Barbados 2730
Sierra Leone - St. Vincent 1915
St. Vincent - Ascension 1627
St. Vincent - St. Helena 1014
Sierra Leone - C. Coast Castle 1116
Sierra Leone - Ascension 1632
Sierra Leone - St. Helena 1286
Ascension - C. Coast Castle 1296
Ascension - Fernando Po 1567
Fernando Po - Ascension 1686
Kongo R. - Ascension 1570
Loanda - Ascension 1644
Kongo R. - St. Helena 1219
St. Helena - Kongo R. 1664
St. Helena - C. Coast Castle 1296
Pernambuco - Ascension 1217
Pernambuco - St. Helena 1776
Pernambuco - Sierra Leone 2915
Rio de Janeiro - Ascension 2837
Rio de Janeiro - St. Helena 2941
Rio de Janeiro - Cape 2131
Rio de Janeiro - Montevideo 881
Montevideo - Ascension 2837
Montevideo - Cape 3265
Montevideo - St. Helena 2941
Montevideo to Cape 3615
Cape to Montevideo 3710
Cape - Pernambuco 3320
Cape - St. Helena 1682
Cape - Madeira Is 4619
Cape - Sierra Leone 3146
Cape - Stanley Harbor 4160
Cape - Mozambique 1850
Cape St. Vincent 3858
Port Stanley - Montevideo 1000
Montevideo - Cape 3615
Montevideo - Falkland Is. 1259
Montevideo - Cape 3265
Mauritius - Natal 1590
Mauritius - Cape 2200
Natal - Mauritius 1590
Natal - Cape 2200
Cape - Mozambique 1850
Cape - Madeira Is 4619
Cape - Sierra Leone 3146
Cape - St. Helena 1682
Cape - Pernambuco 3320
Cape - Stanley Harbor 4160
Cape - Montevideo 3710
Montevideo - Cape 3615
Montevideo - Falkland Is. 1259
Montevideo - Cape 3265
Rio de Janeiro - Montevideo 881
Rio de Janeiro - St. Helena 2941
Rio de Janeiro - Ascension 2837
Rio de Janeiro - Cape 2131
Pernambuco - St. Helena 1776
Pernambuco - Ascension 1217
Pernambuco - Sierra Leone 2915
Ascension - St. Helena 1627
Ascension - Sierra Leone 1632
Ascension - C. Coast Castle 1296
Ascension - Fernando Po 1567
Fernando Po - Ascension 1686
Kongo R. - Ascension 1570
Loanda - Ascension 1644
Kongo R. - St. Helena 1219
St. Helena - Kongo R. 1664
St. Helena - C. Coast Castle 1296
St. Helena - Cape 2131
St. Helena - Kongo R. 1219
St. Helena - Ascension 1570
St. Helena - Loanda 1644
St. Helena - Ascension 1570
St. Helena - Kongo R. 1219
St. Helena - Cape 2131
St. Helena - Ascension 1570
St. Helena - Loanda 1644

BOMBAY TO ADEN (S.W. Monsoon) 1680
ADEN - KARACHI 1640
ADEN - BOMBAY 1640
ADEN - COLOMBO 2130
ZANZIBAR TO BOMBAY (S.W. Monsoon) 2590
ZANZIBAR TO BOMBAY (N.E. Monsoon) 2570
BOMBAY TO ZANZIBAR (S.W. Monsoon) 2530
ZANZIBAR TO BOMBAY (N.E. Monsoon) 2700
ADEN - MAHÉ 1430
ADEN - DIEGO GARCIA 2080
CAPE - BOMBAY 4610
BOMBAY - MAHÉ 1760
BOMBAY - CAPE 4650
BOMBAY - MAURITIUS 2540
MAURITIUS TO BOMBAY 2540
BOMBAY TO ZANZIBAR 1000
ZANZIBAR - MAHÉ 1000
MAHÉ - COLOMBO 1650
MAHÉ - DIEGO GARCIA 1020
MAHÉ - MOZAMBIQUE 1080 OR CAPE 2910
MAHÉ - CAPE 2550
MAURITIUS TO ADEN 2920 (S.W. Monsoon)
COLOMBO - MAURITIUS 3210
DIEGO GARCIA - MAURITIUS 1140
DIEGO GARCIA - COLOMBO 2180
DIEGO GARCIA - SINGAPORE 2080
COLOMBO - PENANG 1270 OR SINGAPORE 1680
COLOMBO 2200
COLOMBO - RANGOON 1280
MADRAS - RANGOON 990
SINGAPORE 1630
SINGAPORE - HONGKONG 1386
SINGAPORE - KING GEORGE SD. 3380
SINGAPORE - TANDJONG PRIOK 700
SUNDA STR. 1770
ADEN - SUNDA STRAIT 3750
TORRES STR. ADEN 5970
DIEGO GARCIA - SUNDA STR. 1980 OR SINGAPORE 2490
SUNDA STR. 2950 OR SINGAPORE 3030
MAURITIUS TO SUNDA STR. 2950 OR SINGAPORE 3030
MAURITIUS - TORRES STRAIT 4920
DIEGO GARCIA - KING GEORGE SD. 5140 MELBOURNE 6460
ADEN - KING GEORGE SD. 3010
HOBART TO DIEGO GARCIA 4480, TO ADEN 6600
KING GEORGE SD. 4970 MELBOURNE 6320
COLOMBO - KING GEORGE SD. 3380
KING GEORGE SOUND TO MAURITIUS 3510
KING GEORGE SOUND TO MAURITIUS 3350
MAURITIUS TO KING GEORGE SOUND 3300
ADEN TO WELLINGTON 7880
MAURITIUS TO WELLINGTON 5900
CAPE TO WELLINGTON 7170
SUNDA STRAIT TO CAPE 5070
CAPE TO SUNDA STRAIT 5040
CAPE TO MAURITIUS 2290
MAURITIUS TO CAPE 2270
CAPE - NATAL 1590 OR CAPE 2400
NATAL - MOZAMBIQUE 1850
CAPE - MOZAMBIQUE 2400
CAPE TO KING GEORGE SOUND 4880, TO ADELAIDE 5760, TO MELBOURNE 6030, TO SYDNEY 6500

Note Vessels may make quicker passages by going further South, but better weather will as a rule be found on this parallel

	QUEBEC	HALIFAX	CHARLOTTETOWN PEI	PHILADELPHIA	BALTIMORE	NEWPORT NEWS	CHARLESTON	SAVANNAH	BERMUDA	KEY WEST	HABANA	SAINT THOMAS	PORT CASTRIES	DEMERARA	PERNAMBUCO	BAHIA	RIO DE JANEIRO	MONTEVIDEO	BUENOS AIRES	PUNTA ARENAS (SANDY PT.)
NEW YORK	581	828	229	404	281	629	699	676	1171	1215	1428	1746	2209	3696	4096	4778	5768	5863	6890	

XUM


AUSTRALIA
Alice Springs
Mataburra
Charleville
Brisbane
Sydney
Melbourne
Hobart
Adelaide
Wellington
Auckland
Norfolk I
Raoul I
KERMADEC IS
CHATHAM IS
NEW ZEALAND
NORTH I
SOUTH I
TASMANIA
Perth
Fremantle
Geraldton
Eucla Hbr
Fowler-Bight
Streaky B
Ellistons
Wilson
Augusta
Waltaroo
Wakefield
Israelite B
Eyres
Esperance B
Albany
King George Sd
Pt D'Entrecasteaux
C Borda
Robe
Portland
Warrnambool
Port Phillip Bay
Hobsons Bay
Port Albert
Gabo I
Moruya
Kiama
Newcastle
Port Stephens
Coffs Harbour
Maryborough
Gympie
Gladstone
Rockhampton
Townsville
Mackay
Charleville
Normanton
Burketown
Wyndham
Darwin
Broome
Port Hedland
Carnarvon
Geraldton
Dongara
P Gregory
Derby
Onslow
Exmouth
Cossack
Roebourne
Port Walcott
Broome
Wyndham
Darwin
Groote Eylandt
Gove
Weipa
Thursday I
Cape York
Torres Strait
Arafura Sea
Timor Sea
Gulf of Carpentaria
Coral Sea
Tasman Sea
Great Australian Bight
Bass Strait
Spencer Gulf
Gulf St Vincent
Lake Eyre
Lake Torrens
Lake Gairdner
Lake Amadeus
Lake Mackay
Lake Nash
Lake Macleod
Lake Barlee
Lake Ballard
Lake Carnegie
Lake Disappointment
Great Sandy Desert
Gibson Desert
Great Victoria Desert
Nullarbor Plain
Simpson Desert
Strzelecki Desert
Tanami Desert
Great Artesian Basin
Great Dividing Range
Flinders Ranges
Musgrave Ranges
Macdonnell Ranges
Hamersley Range
Ashburton R
Fortescue R
Murchison R
Gascoyne R
Murray R
Darling R
Lachlan R
Murrumbidgee R
Snowy Mts
Mt Kosciusko
Mt Cook
Mt Egmont
Mt Ruapehu
Mt Tongariro
Mt Taranaki
Mt Ngauruhoe
Mt Tarawera
Mt Tutoko
Mt Aspiring
Mt Earnslaw
Mt Hikurangi
Mt Ruahine
Mt Egmont
Lake Taupo
Lake Rotorua
Lake Wairarapa
Lake Ellesmere
Lake Wanaka
Lake Hawea
Lake Wakatipu
Lake Manapouri
Lake Te Anau
Lake Waikaremoana
Lake Waikaremoana
Lake Rotoiti
Lake Rotoaira
Lake Tarawera

SOUTH PACIFIC OCEAN

WEST COASTS OF NORTH AND SOUTH AMERICA

NEW ZEALAND

Norfolk I.

KERMADEC IS

Raoul I

Austral Is

Easter I.

CHATHAM IS

Auckland

Wellington

Christchurch

Dunedin

Invercargill

Bluff Hbr

Akaroa Hbr

Lyttelton

Timaru

Oamaru

Greymouth

Hokitika

Westport

Charleston

Collingwood

N. Plymouth

Hokianga

Warkworth

Whangarei

Russell

Takapuna

Thames

Tauranga

Gisborne

Napier

Wanganu

Opotiki

Raetihi

Waiouru

Foxton

Nelson

Blenheim

Kaikoura

Ashburton

Timaru

Oamaru

Palmerston

Dunedin

Riverton

Stewart I.

NORTH I.

SOUTH I.

Mount Cook

Mount Egmont

Mount Ruapehu

Mount Tongariro

Mount Ngauruhoe

Mount Tarawera

Mount Ruahine

Mount Hikurangi

Mount Tapuaenuku

Mount Aspiring

Mount Earnslaw

Mount Tutoko

Mount Cook

Mount Sefton

Mount Haast

Mount Aspiring

Mount Earnslaw

Mount Tutoko

Mount Sefton

Mount Haast

Mount Cook

Mount Egmont

Mount Ruapehu

Mount Tongariro

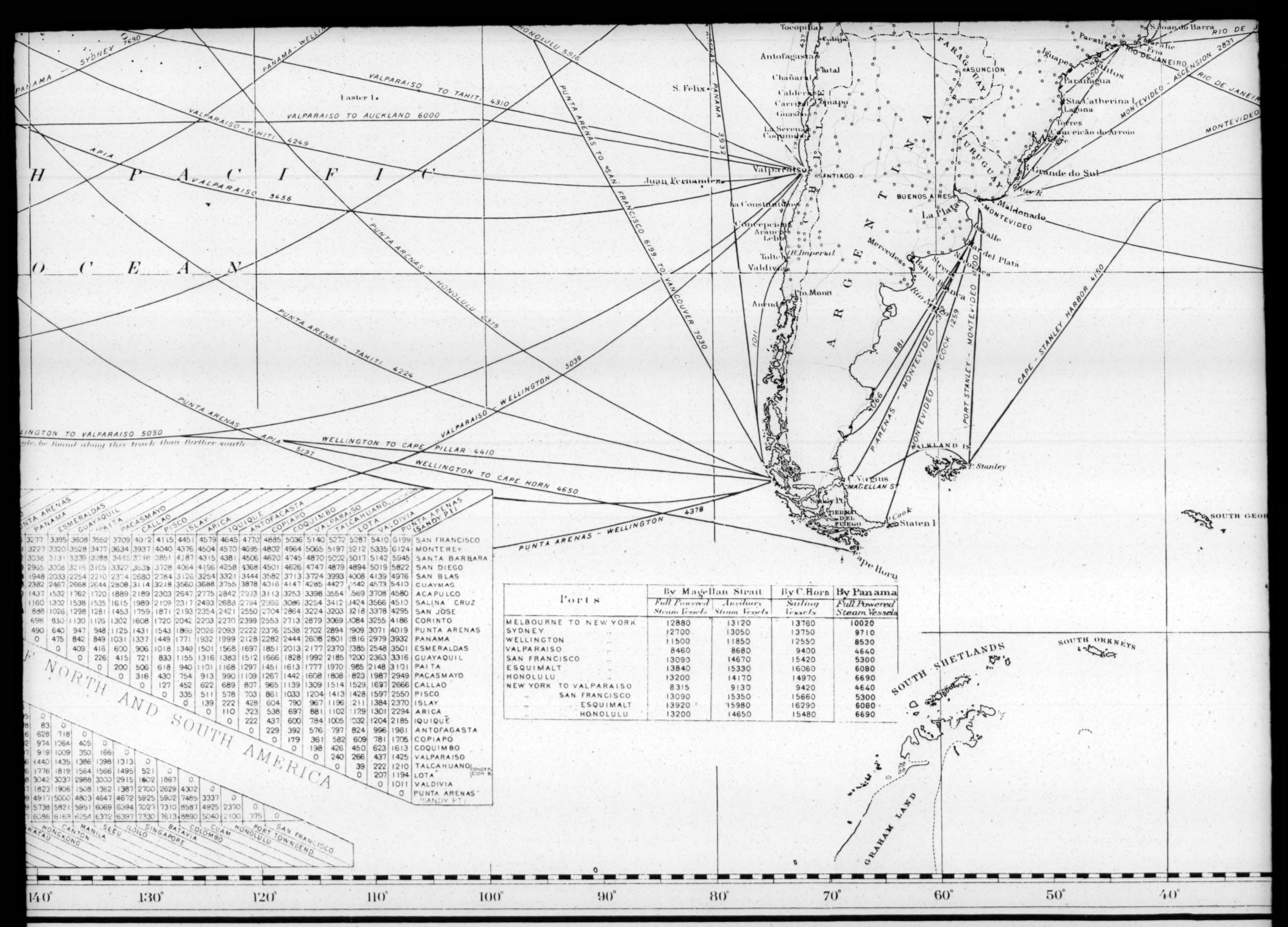
Mount Ngauruhoe

Mount Tarawera

Mount Ruahine

Mount Hikurangi

Mount Tapuaenuku



Ports	By Magellan Strait		By C. Horn	By Panama
	Full Powered Steam Vessels	*Auxiliary Steam Vessels*	*Sailing Vessels*	*Full Powered Steam Vessels*
MELBOURNE TO NEW YORK	12880	13120	13760	10020
SYDNEY "	12700	13050	13750	9710
WELLINGTON "	11500	11850	12550	8530
VALPARAISO "	8460	8680	9400	4640
SAN FRANCISCO "	13090	14670	15420	5300
ESQUIMALT "	13840	15330	16060	6080
HONOLULU "	13200	14170	14970	6690
NEW YORK TO VALPARAISO	8315	9130	9420	4640
" SAN FRANCISCO	13090	15350	15660	5300
" ESQUIMALT	13920	15980	16290	6080
" HONOLULU	13200	14650	15480	6690

NORTH AND SOUTH AMERICA

	PUNTA ARENAS	PANAMA	ESMERALDAS	GUAYAQUIL	PAITA	PACASMAYO	CALLAO	PISCO	ISLAY	ARICA	IQUIQUE	ANTOFACASTA	COPIAPO	COQUIMBO	VALPARAISO	TALCAHUANO	LOTA	VALDIVIA	PUNTA ARENAS (SANDY PT.)	
SAN FRANCISCO	6199	3277	3395	3608	3552	3709	4012	4115	4451	4579	4645	4770	4885	5036	5140	5272	5287	5410	6199	SAN FRANCISCO
MONTEREY	6124	3227	3320	3528	3477	3634	3937	4040	4376	4504	4570	4695	4802	4964	5065	5197	5212	5335	6124	MONTEREY
SANTA BARBARA	5945	3036	3131	3339	3288	3445	3748	3851	4187	4315	4381	4506	4620	4745	4870	5002	5017	5142	5945	SANTA BARBARA
SAN DIEGO	5822	2965	3008	3216	3165	3322	3629	3728	4064	4196	4258	4368	4501	4626	4747	4879	4894	5019	5822	SAN DIEGO
SAN BLAS	4976	1948	2033	2254	2210	2374	2680	2784	3126	3254	3321	3444	3582	3713	3724	3993	4008	4139	4976	SAN BLAS
GUAYMAS	5410	2382	2467	2668	2644	2808	3114	3218	3560	3688	3755	3878	4016	4147	4285	4427	4442	4573	5410	GUAYMAS
ACAPULCO	4580	1437	1532	1762	1720	1889	2189	2303	2647	2775	2842	2973	3113	3253	3398	3554	3569	3708	4580	ACAPULCO
SALINA CRUZ	4510	1160	1302	1538	1535	1615	1989	2109	2317	2493	2688	2794	2966	3086	3254	3412	3424	3566	4510	SALINA CRUZ
SAN JOSE	4295	848	1026	1298	1281	1453	1759	1871	2193	2354	2421	2550	2704	2864	3224	3203	3218	3378	4295	SAN JOSE
CORINTO	4186	698	830	1130	1126	1302	1608	1720	2042	2203	2270	2399	2553	2713	2879	3069	3084	3255	4186	CORINTO
PUNTA ARENAS	4019	490	640	947	948	1125	1431	1543	1866	2026	2093	2222	2376	2538	2702	2894	2909	3071	4019	PUNTA ARENAS
PANAMA	3932	0	475	842	849	1031	1337	1449	1771	1932	1999	2128	2282	2444	2608	2801	2816	2979	3932	PANAMA
ESMERALDAS	3501		0	409	416	600	906	1018	1340	1501	1568	1697	1851	2013	2177	2370	2385	2548	3501	ESMERALDAS
GUAYAQUIL	3316			0	226	415	721	833	1155	1316	1383	1512	1666	1828	1992	2185	2200	2363	3316	GUAYAQUIL
PAITA	3101				0	200	506	618	940	1101	1168	1297	1451	1613	1777	1970	985	2148	3101	PAITA
PACASMAYO	2949					0	316	430	754	913	990	1109	1267	1442	1608	1808	823	1987	2949	PACASMAYO
CALLAO	2666						0	127	452	622	689	807	965	1139	1309	1514	1529	1697	2666	CALLAO
PISCO	2550							0	335	511	578	703	861	1033	1204	1413	1428	1597	2550	PISCO
ISLAY	2370								0	139	222	428	604	790	967	1196	211	1384	2370	ISLAY
ARICA	2294									0	110	323	538	697	881	1102	1129	1301	2294	ARICA
IQUIQUE	2185										0	222	437	600	784	1005	032	1204	2185	IQUIQUE
ANTOFAGASTA	1981											0	229	392	576	797	824	996	1981	ANTOFAGASTA
COPIAPO	1705												0	179	361	582	609	781	1705	COPIAPO
COQUIMBO	1613													0	198	426	450	623	1613	COQUIMBO
VALPARAISO	1425														0	240	266	437	1425	VALPARAISO
TALCAHUANO	1210															0	39	222	1210	TALCAHUANO
LOTA	1194																0	207	1194	LOTA
VALDIVIA	1011																	0	1011	VALDIVIA
PUNTA ARENAS (SANDY PT.)	0																		0	PUNTA ARENAS (SANDY PT.)

	HONGKONG	CANTON	MANILA	SEEU	ILOILO	SINGAPORE	BATAVIA	COLOMBO	GUAM	HONOLULU	PORT TOWNSEND	SAN FRANCISCO	
NAGASAKI	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	NAGASAKI
YOKOHAMA	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	YOKOHAMA
HAKODATE	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	HAKODATE
PORT TOWNSEND	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	PORT TOWNSEND
HONOLULU	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	HONOLULU
GUAM	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	GUAM
COLOMBO	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	COLOMBO
BATAVIA	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	BATAVIA
SINGAPORE	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	SINGAPORE
ILOILO	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	ILOILO
SEEU	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	SEEU
MANILA	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	MANILA
CANTON	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	CANTON
HONGKONG	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	HONGKONG
SWATAU	1805	1805	1805	1805	1805	3805	4805	5805	5805	4805	4805	5805	SWATAU

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By Magellan Strait		By C. Horn	By Panama
Full Powered Steam Vessels	*Auxiliary Steam Vessels*	*Sailing Vessels*	*Full Powered Steam Vessels*
12880	13120	13760	10020
12700	13050	13750	9710
11500	11850	12550	8530
8460	8680	9400	4640
13090	14670	15420	5300
13840	15330	16060	6080
13200	14170	14970	6690
8315	9130	9420	4640
13090	15350	15660	5300
13920	15980	16290	6080
13200	14650	15480	6690

	NEW YORK	PORTLAND	BOSTON	QUEBEC	HALIFAX	CHARLOTTETOWN P.E.I.	PHILADELPHIA	BALTIMORE	NEWPORT NEWS	CHARLESTON	SAVANNAH
KEY WEST	0	362	300	1404	581	828	229	404	281	629	699
APALACHICOLA	357	0	111	1161	343	575	529	693	567	901	971
PENSACOLA	459	134	0	1205	383	627	477	641	515	849	919
MOBILE	512	195	77	0	861	570	1558	1739	1613	1904	1978
SHIELDSBORO	535	234	120	100	0	273	735	836	710	1077	1147
NEW ORLEANS	567	321	229	211	170	0	0	982	1137	1011	1323	1393
SABINE CITY	724	491	406	391	353	351	0	0	355	229	594	664
GALVESTON	755	529	445	431	392	390	54	0	0	156	550	620
MATAGORDA	847	642	559	545	507	505	192	134	0	0	424	494
RIO GRANDE	835	682	598	584	552	550	284	237	180	0	0	88
TAMPICO	893	819	749	739	695	705	495	453	407	230	0	0
TUSPAN	894	840	781	784	760	744	562	520	456	318	90	0
VERA CRUZ	854	875	840	835	790	788	646	611	581	415	203	66	0
TABASCO	724	780	765	772	750	745	675	655	623	510	360	305	204	0
CARMEN	694	762	751	751	728	738	675	658	662	530	393	340	240	60	0
CAMPECHE	611	679	668	668	645	655	625	615	633	523	432	325	321	153	107	0
HABANA	90	421	512	557	573	597	738	785	847	919	853	856	809	680	647	564	0
CIENFUEGOS	510	752	803	838	841	851	947	967	1003	992	981	951	920	785	755	682	482	0
PORT ROYAL, JAM.	758	1014	1064	1099	1102	1112	1208	1228	1264	1248	1237	1207	1176	1041	1011	938	740	327	0
PORT AU PRINCE	657	1007	1109	1162	1185	1215	1356	1392	1466	1450	1439	1409	1384	1243	1213	1140	653	528	268	0
CAPE HAITIEN	624	981	1083	1136	1159	1189	1330	1366	1456	1448	1449	1419	1388	1253	1223	1150	614	533	316	205	0
SANTO DOMINGO	984	1341	1443	1493	1496	1506	1602	1622	1658	1645	1634	1604	1573	1438	1408	1335	929	720	421	459	394
SAINT THOMAS	1040	1397	1499	1552	1575	1605	1746	1772	1762	1754	1746	1874	1843	1708	1678	1605	1019	958	684	630	442
POINTE Á PITRE GUAD.	1313	1670	1772	1825	1848	1725	2019	2055	2045	2037	2119	2089	2058	1923	1893	1820	1269	1189	397	884	699
PORT CASTRIES ST LUC	1360	1717	1819	1842	1895	1925	2066	2112	2102	2094	2159	2129	2098	1963	1933	1860	1360	1230	927	947	760
BELIZE	590	799	848	875	872	882	969	985	1047	986	981	951	920	785	755	682	529	520	680	932	957
GREYTOWN	965	1174	1223	1250	1247	1257	1344	1360	1422	1361	1356	1326	1295	1160	1130	1057	891	719	592	840	890
COLON (ASPINWALL)	1086	1295	1344	1371	1368	1380	1465	1481	1543	1482	1477	1447	1416	1281	1251	1178	1013	767	546	770	814
CARTAGENA	1112	1379	1428	1455	1452	1462	1549	1565	1627	1566	1561	1531	1500	1365	1335	1262	1075	765	463	644	678
CURAÇAO	1137	1494	1596	1649	1672	1702	1789	1805	1867	1806	1801	1771	1740	1605	1575	1502	1145	900	580	662	698
PUERTO CABELLO	1244	1601	1703	1756	1779	1808	1895	1911	1973	1912	1907	1877	1846	1711	1681	1608	1240	1012	685	764	751
LA GUIARA	1282	1639	1741	1794	1817	1846	1933	1949	2011	1950	1945	1915	1884	1749	1719	1646	1275	1044	726	803	750
P. SPAIN	1485	1842	1944	1997	2020	2050	2191	2202	2303	2242	2237	2207	2176	2041	2011	1938	1521	1288	990	1065	894

SHORES OF THE GULF OF MEXICO AND EAST COASTS OF NORTH AMERICA

KEY WEST · APALACHICOLA · PENSACOLA · MOBILE · SHIELDSBORO · NEW ORLEANS · SABINE CITY · GALVESTON · MATAGORDA · RIO GRANDE · TAMPICO · TUSPAN · VERA CRUZ · TABASCO · CARMEN · CAMPECHE · HABANA · CIENFUEGOS · PORT ROYAL · PORT AU

80° 70° 60° 50° 40° 30° 20° West Longitude 10° Meridian of 0° Greenwich 10° East Longitude 20°

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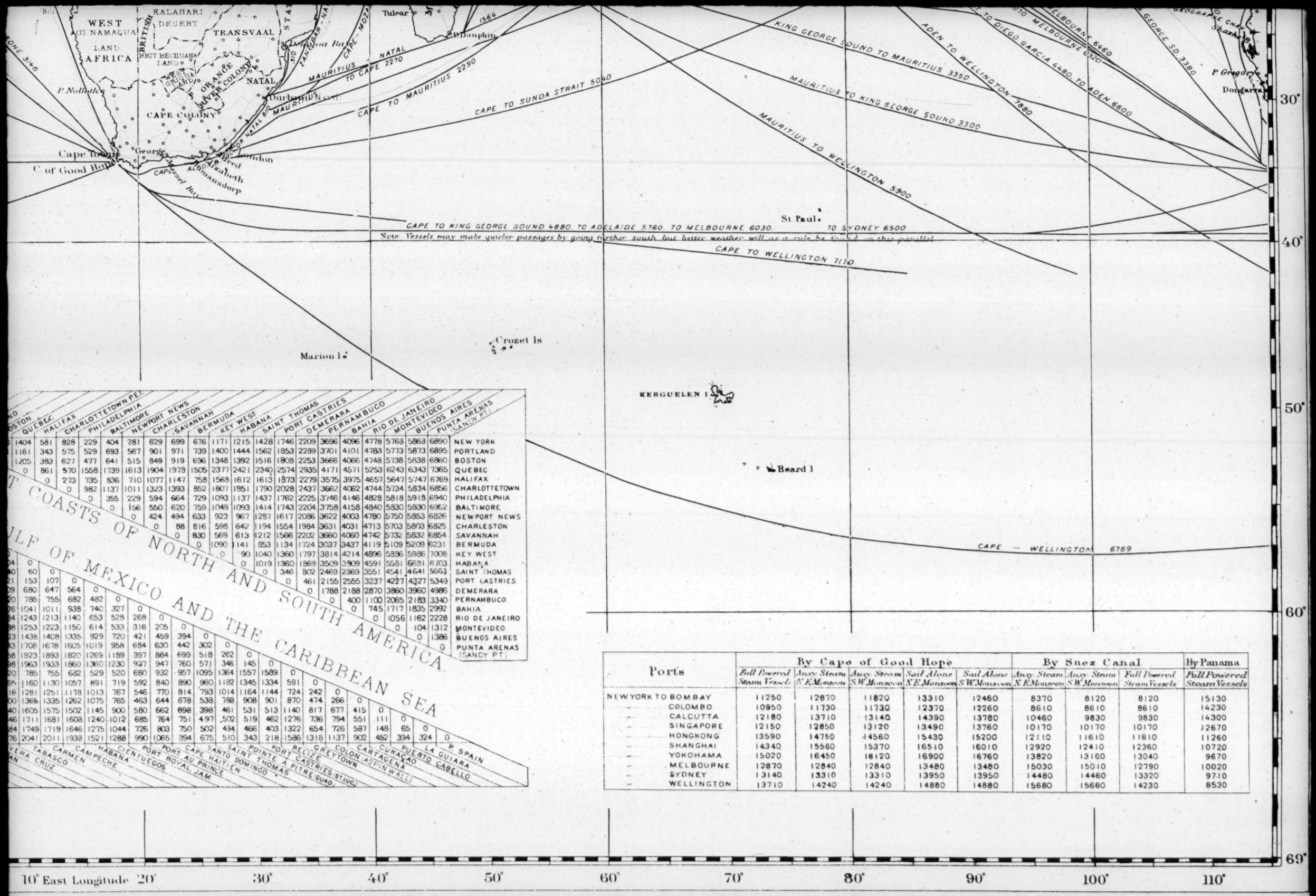

DISTANCES BETWEEN PORTS ON THE EAST COASTS OF NORTH AND SOUTH AMERICA AND THE GULF OF MEXICO AND THE CARIBBEAN SEA

	BOSTON	QUEBEC	HALIFAX	CHARLOTTETOWN P.E.I.	PHILADELPHIA	BALTIMORE	NEWPORT NEWS	CHARLESTON	SAVANNAH	BERMUDA	KEY WEST	HABANA	SAINT THOMAS	PORT CASTRIES	DEMERARA	PERNAMBUCO	BAHIA	RIO DE JANEIRO	MONTEVIDEO	BUENOS AIRES	PUNTA ARENAS (SANDY PT.)
NEW YORK	206	404	581	828	229	404	281	629	699	676	1171	1215	1428	1746	2209	3696	4096	4778	5763	5863	6890
PORTLAND	107	1161	343	575	529	693	567	901	971	739	1400	1444	1562	1853	2289	3701	4101	4783	5773	5873	6895
BOSTON	0	1205	383	627	477	641	515	849	919	696	1348	1392	1516	1808	2253	3666	4066	4748	5738	5838	6860
QUEBEC		0	861	570	1558	1739	1613	1904	1978	1505	2377	2421	2340	2574	2935	4171	4571	5253	6243	6343	7365
HALIFAX			0	273	735	836	710	1077	1147	758	1568	1612	1613	1873	2279	3575	3975	4657	5647	5747	6769
CHARLOTTETOWN P.E.I.				0	982	1137	1011	1323	1393	852	1807	1851	1790	2028	2437	3662	4062	4744	5734	5834	6856
PHILADELPHIA					0	355	229	594	664	729	1093	1137	1437	1762	2225	3746	4146	4828	5818	5918	6940
BALTIMORE						0	156	550	620	759	1049	1093	1414	1743	2204	3758	4158	4840	5830	5930	6952
NEWPORT NEWS							0	424	494	633	923	967	1287	1617	2086	3622	4003	4780	5750	5853	6826
CHARLESTON								0	88	816	598	642	1194	1554	1984	3631	4031	4713	5703	5803	6825
SAVANNAH									0	830	569	613	1212	1566	2202	3660	4060	4742	5732	5832	6854
BERMUDA										0	1090	1141	853	1134	1724	3037	3437	4119	5109	5209	6231
KEY WEST											0	90	1040	1360	1797	3814	4214	4896	5896	5986	7008
HABANA												0	1019	1360	1869	3509	3909	4591	5581	6681	6703
SAINT THOMAS													0	346	802	2469	2369	3551	4541	4641	5663
PORT CASTRIES														0	461	2155	2555	3237	4227	4327	5349
DEMERARA															0	1788	2188	2870	3860	3960	4986
PERNAMBUCO																0	400	1100	2065	2183	3340
BAHIA																	0	745	1717	1835	2992
RIO DE JANEIRO																		0	1056	1162	2228
MONTEVIDEO																			0	104	1312
BUENOS AIRES																				0	1386
PUNTA ARENAS (SANDY PT.)																					0
P SPAIN																					
LA GUAIRA																					
PUERTO CABELLO																					
CURAÇAO																					
CARTAGENA																					
COLON (ASPINWALL)																					
GREYTOWN																					
PORT CASTRIES (ST. LUC)																					
BELIZE																					
POINTE A PITRE (GUAD.)																					
SAINT THOMAS																					
SANTO DOMINGO																					
PORT CAPE HAITIEN																					
PORT AU PRINCE																					
PORT ROYAL JAM.																					
CIENFUEGOS																					
HABANA																					
CAMPECHE																					
CARMEN																					
TABASCO																					
VERA CRUZ																					
SAN																					

PASSAGES FROM PORTS IN THE UNITED KINGDOM TO PORTS IN INDIA, CEYLON, CHINA, JAPAN, AUSTRALIA AND NEW ZEALAND

Ports	By Cape of Good Hope					By Suez Canal			By Panama
	Full Powered Steam Vessels	*Auxy. Steam N.E. Monsoon*	*Auxy. Steam S.W. Monsoon*	*Sail Alone N.E. Monsoon*	*Sail Alone S.W. Monsoon*	*Auxy. Steam N.E. Monsoon*	*Auxy. Steam S.W. Monsoon*	*Full Powered Steam Vessels*	*Full Powered Steam Vessels*
NEW YORK TO BOMBAY	11250	12870	11820	13310	12460	8370	8120	8120	15130
" COLOMBO	10950	11730	11730	12370	12260	8610	8610	8610	14230
" CALCUTTA	12180	13710	13140	14390	13780	10460	9830	9830	14300
" SINGAPORE	12150	12850	13120	13490	13760	10170	10170	10170	12670
" HONGKONG	13590	14750	14560	15430	15200	12110	11610	11610	11260
" SHANGHAI	14340	15560	15370	16510	16010	12920	12410	12360	10720
" YOKOHAMA	15020	16450	16120	16900	16760	13820	13160	13040	9670
" MELBOURNE	12870	12840	12840	13480	13480	15030	15010	12790	10020
" SYDNEY	13140	13310	13310	13950	13950	14480	14460	13320	9710
" WELLINGTON	13710	14240	14240	14880	14880	15680	15660	14230	8530

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THE NATIONAL GEOGRAPHIC MAGAZINE

RUSSIA*

BY HON. CHARLES EMORY SMITH

FORMERLY MINISTER TO RUSSIA AND EX-POSTMASTER GENERAL

AT the very outset I shall throw myself on your kind indulgence. I hope you will not think me one of that rash company, more numerous in enrollment than polite in name, that rush in where angels fear to tread. Believe me, I know full well the difficulty and the delicacy of my venture, and have known it from the start. The only excuse that can be pleaded in extenuation of the hazard is that the persuasiveness of your committee, if not greater than the restraint of my warning good sense, was at least more potent than the firmness of my resolution.

Russia just now is at the best a tempting but perilous theme. Half a century hence it will be possible to look back through the clear perspective of years and measure the true relations of the events of today to a new career of progress and greatness. But in the present hour we see the portents without the promise, and Russia is shadowed by the gloom of the clouds without the gleam of the sun. The inherent difficulties of the subject are enhanced by the personal position of the speaker. There are phases on which it is becoming that I should speak with reserve—perhaps, to use an Hibernianism, with silence—on the principle, "the wisest word I ever said was the word that wasn't spoken." It is true that the diplomatic trust was laid down some years ago, and the easier, if not higher, diplomacy of American free speech was resumed; and you will permit me to amend the words of the poet and say:

More true joy returned Marcellus feels
Than exiled Minister with a Senate at his heels.

But there are obvious proprieties which follow the minister even in retirement; yet while they should be respected, there is still large room for free expression. I did not hesitate to say in St Petersburg, looking out from the Foreign Office upon the broad Alexander Place, from the center of which rises the stately and splendid memorial shaft to the first Alexander, that there were things in Russia which we of the United States, in the best spirit of sincere friendship, could wish otherwise,

*An address to the National Geographic Society, January 20, 1905.

and I do not hesitate to say it here. Russia does not resent honest criticism. She criticises herself. Her statesmen are sensible of her relations to the spirit of the age and are conscious of her difficulties and shortcomings. She only asks—and does she not rightly ask?—that judgment shall be pronounced in good faith, and with an honest purpose to be fair. She is often silent when in justice to herself she ought to speak. To my mind it is a mistaken policy, for while it avoids answer where answer would sometimes be difficult, it leaves a hundred misrepresentations to pass unchallenged; but, mistaken or not, it is the tradition of a power which meets political hostility or thrifty sensationalism with disdain.

And certainly, if there be a grateful sense of invaluable service, we of America ought at least to seek to be fair. We never can be deaf to the call of humanity. We cannot be blind to the errors which have followed unfortunate counsels. We must deal with living issues and with present events as truth requires; but we can and we ought to fulfill the obligations of duty and speak the voice of judgment in the spirit of honest and manly friendship. For Russia was our truest friend in the hour of our supreme trial. Tradition has handed down this impressive truth, and both the public archives and the unwritten records confirm it. You know that in the critical period of the civil war, when we were threatened with French and English intervention, the Russian fleet appeared in the harbor of New York. The testimony is not wanting which discloses the inspiration and the purposes that placed it within that friendly and protecting proximity. There has been some dispute over this question, and the attempt has been made to discredit the sympathetic attitude and the actual service of Russia, but the evidence is clear and conclusive.

Shortly after the war began in 1861, the Secretary of State, Mr Seward, addressed the European governments, setting forth the American position. Prince Gortchakoff, the great Russian chancellor, wrote these words in reply:

"The Union is not simply in our eyes an element essential to the universal political equilibrium. It constitutes besides a nation to which our august master and all Russia have pledged the most friendly interest, for the two countries, placed at the extremities of the two worlds, both in the ascending period of their development, appear called to a natural community of interest and of sympathies, of which they have already given mutual proofs to each other."

That unequivocal answer, made at the very beginning, plainly indicated the friendly attitude of Russia. Through the Russian government, with its special sources of information, President Lincoln's administration was kept advised of what the other governments of Europe were meditating and proposing. Official France was hostile. The French people were sympathetic, as they had been from the days of the American Revolution. But Louis Napoleon, who was then on the throne, had his own designs, which were disclosed in Mexico. Official England, unlike the official England of these later years, was also hostile. A large proportion of the English people, many of whom in Lancashire deeply suffered on account of our war and the deprivation of cotton, were right in their instincts. The great and good Queen was our steadfast friend. But Palmerston and Lord Russell, and even Mr Gladstone, whom we have all so greatly admired and honored, looked on our struggle with unkindly thought.

In the early days of the war Secretary Seward was apprised, through the legation at St Petersburg, that the French and English governments had come to an understanding for joint action re-

specting the American war involving the possible recognition of the Southern Confederacy. When, soon afterwards, the French and English ministers appeared at the State Department together his information prepared him to meet them. Knowing their object, Mr Seward politely avoided receiving them jointly and adroitly turned one off with a dinner invitation while he saw the other alone. But the joint movement of the two governments went on. Joint action on neutrality pointed the way to joint action on intervention. Who could measure the dangers of such a portentous step? Would Mr Lincoln's government, already absorbed in a life-and-death grapple with a giant rebellion, also accept the gage of war with the united strength of the two great nations of western Europe? Could it hope to prevail against these combined perils, or would the unequal struggle leave the Union irretrievably divided and broken?

That was the startling menace. Russia's feeling was known, and before the blow was struck it was important to know what Russia would do. Louis Napoleon took steps to ascertain—I have reason to believe through an autograph letter to the Czar, Alexander II, advising him that the French and English governments believed the time had come when they ought to mediate or intervene between the North and South, and inviting him to join in the movement. The Czar declined to do so unless Mr Lincoln's government should request it. But the menace continued, and thereupon the Russian fleet steamed into the bay of New York and cast anchor within sight of Trinity spire. All the world knew what that act meant; Louis Napoleon knew, and the threatened intervention never came.

This chapter of past judgments does not justify any misjudgments now, but it does impose the obligation of seeking to pronounce present judgments in a fair and just spirit. Russia is engaged at this hour in a foreign war which has thus far been full of surprises and disasters, and she is at the same time in the throes of a domestic agitation which, let us hope, will lead to a great advance for the Empire. No treatment of the general subject can ignore these phases, and they will be the better understood if we look at them against the background of the national structure and organization and character.

Russia is a country of extraordinary contrasts; of imperial splendor and of widespread poverty; of the magnificence of the court and of the squalor of the moujik; of the stately grandeur of St Petersburg or the picturesque orientalism of Moscow, and of the dreary, dead level of dull and endless plains; of the highest culture and the broadest ignorance; of the boundless treasures of the unequaled Winter Palace, with its 500 opulent rooms, or of imposing St Isaac's, with its malachite columns and its golden dome, and of the boundless destitution of almost uncounted millions; of the literary genius of Poushkin and Gogol, of Tourgenieff and Tolstoi, and of the dense illiteracy of the masses; of the pictorial wonders of Verestchagin and of the most primitive agricultural and industrial arts—in a word, of the highest development of grace and culture in social life and of the deepest penury and hardship on the broad national field.

And as it is a country of extremes in condition so it has been portrayed in extremes of opinion. On the one hand it has been painted in the blackest of colors. It has been pictured as a land of Tartar barbarism and of Muscovite tyranny, where the Siberian exile is the expression of all cruelty and the Jewish proscription as the embodiment of all intolerance and persecution. Its government has been described as a despotism tempered by assassination. On the other hand it has been delineated in some quarters as a benign and patri-

archal system, where the sole thought of the Little Father is the welfare of the millions of his people, and where the acknowledged grace of the throne is accepted as the proof of the general practice. It is easy to produce striking effects with strong pigments. There would be a ready and startling sensationalism in a vivid picture of terrors and in a flaming outburst of rhetoric. But, as generally happens, the truth lies between the extremes. It is not all black or all white, but it has its lights and its shadows, and the faithful delineator must sacrifice the bold outlines of a fanciful sketch for the more sub dued tones of historic verity.

The character of autocratic rule manifestly depends very much on the character of the autocrat. It is true that in these modern days even the autocrat is largely the creature of conditions. Imperial will is molded and circumscribed by historic tendencies, by overmastering public opinion, and by the spirit of the age. But, on the other hand, the currents of national development fall into the eddies of personal impulse. With the vast machinery of a great modern nation autocracy becomes bureaucracy. But the autocrat makes the bureaucrats, and so determines the trend. There are settled traditions and tendencies in Russia, but they are affected and modified by the dominant temper and influence of the hour. When Russia passed from the scepter of Nicholas I to that of Alexander II she advanced from the virile and robust imperialism of an iron dictator to the progressive and expanding liberalism of an enlightened ruler. When she passed from the control of Alexander III to that of Nicholas II she went from the secure, harsh, rigorous sway of a firm, self-poised, austere monarch to the turbulent reign of a kind, well-meaning, and uncertain sovereign.

The present Czar is conscientious and devoted in public purpose and amiable and exemplary in personal life. He has been surrounded by conflicting influences, and each of the opposing forces has appeared at one time or another to be dominant. The Czar's disposition and tendency have been liberal, as was indicated in the noble impulse which convoked The Hague Conference. If at times there has been a backward movement it was because reactionary elements outside of the throne gained a temporary ascendancy, and if lamentable errors plunged the empire into a war for which she was so illy prepared, it was because irregular influences, outside of the ministry, that were mistakenly trusted, gave evil counsels.

As a rule, Russian ministers are not personal favorites, but are often able statesmen, marked for their places by capacity and fitness. Their commission comes, not from title of nobility, but from the higher title of brains. Curiously as it may cross the prevailing conception of the Russian system, many of them have sprung directly from the ranks of the people. M. de Giers, the astute Minister of Foreign Affairs, who succeeded Gortchakoff and who so long guided the foreign policy of his country, did not inherit rank or fortune. Equally without rank was Vishnegradski, the Minister of Finance, a remarkably able man, whose range of vision covered the finance of all nations, who carried on his table the first free-silver bill just as it was lying on the desks of the American Senate, and whose acute and profound observations, if they could have been properly reported, would have instructed and startled the American people.

His successor, de Witte, who was so long the master spirit of the Russian government, who then fell into disfavor, and who in the present crisis appears to be again rising into favor and ascendancy, is no less a man of the people. He made his first mark as a subordinate railway official, and was rapidly promoted until he became the most power-

ful minister of the empire. Many others might be named to illustrate the same truth of high individual advancement without title or favor and solely on merit. Russia has ministers, but no ministry. There is no united, coherent, responsible governing body. Each minister acts only for himself and is responsible only to the Emperor. Oftentimes ministers antagonize and intrigue against each other. Witte and Plehve were at swords' points. Thus the bureaucracy lacks unity, coöperation, and efficiency. It is disorganized and discordant. Sometimes an individual minister shows tremendous energy in the administration of his department, but the coördinated work which gives united force and strength is missing.

Below the chiefs the system has the vice of venality. It is this which has sapped the strength of the navy and impaired the efficiency of the army. It is this which has provided the gun of inferior range and imparted structural weakness to the battleship. Russia has prodigious resources and almost unlimited power, if it can be made available. She has the giant's strength, but the giant's strength enfeebled by a vicious system and an improvident sloth. There is personal valor and symptomatic defect. There is the brilliant dash of the daring Makaroff, but a strange paralysis and fatality of the fleet. There is the skillful generalship of Kuropatkin, with the patience of Fabius and the fight of Marius, but a want of preparation which leaves him always with inferior numbers. There is the intrepid courage of the heroic Stoessel and his fire-tried troops at Port Arthur, which has excited the admiration of the world, but there is at the same time the lack of equipment which crippled his defense. The fighting quality and the latent power are there, but reconstruction is needed to bring the fruits.

In some directions Russia has made remarkable advances in recent years. The energetic and far-reaching policy of Witte as Finance Minister, with its striking results, has been the subject of great praise and great criticism. It had two central and fundamental conceptions. The first was to make Russia wholly self-sustaining and industrially great by a system which should protect and foster her own manufactures. The second was to concentrate all power and control in the hands of the government by substituting state for local taxation, by the promotion of state ownership of railroads, and by the creation of great state monopolies, like those in spirits, drugs, and kindred articles. The fruits have been tremendous, though possibly in some directions open to question.

The industrial progress of Russia in the face of serious obstacles has been signal. Within ten years the number of hands employed increased from 1,318,048 to 2,098,262 and the value of the output more than doubled. The chief industries are textiles and mines and metals. Cotton manufactures have been rapidly developed. The consumption of cotton has increased in little more than a decade from 117,000,000 kilograms to 257,000,000, and the number of spindles in operation is about 7,000,000. In iron manufacture Russia holds the fourth place among the nations, ranking next to Germany and ahead of France. From 1892 to 1900 the annual production of metallic articles rose in value from 142,000,000 roubles to 276,000,000.

The advance was so rapid that after 1900 there was a reaction, followed by an industrial crisis. In his report on the budget for 1902, M. Witte ascribed the depression to a succession of bad harvests and a withdrawal of foreign capital, caused by the Boer war and the resulting stringency in the European money markets. Doubtless also the extraordinary development had engendered speculation and overproduction.

The great growth had come in spite of deficient transportation, of ignorant and debilitated labor, and of the meager purchasing power of the mass of the people. Russia has made much headway in recent years in remedying the first defect. From 1892 to 1902 more than 17,000 miles of railroad were opened. Within the Russian Empire, not including Manchuria, 4,100 miles of railway were under construction in 1901. With his early training, M. Witte naturally made railroad development a vital part of his great and vigorous policy of national upbuilding—a policy which was largely instrumental in this industrial and commercial expansion. In ten years the passenger traffic on the Russian railroads has multiplied almost five-fold and the freight traffic more than eight-fold.

But there is a deeper and more radical difficulty. It is suggested in the observations of Prince Mestschersky, the bold and brilliant editor of the *Grashdanin*, of St Petersburg. Writing in 1901, he said: "It would be more logical for the development of mills and works to begin with the development of the people, so as to create a consumer, than to begin with the development of factories, mills, and railroads for a people wanting in the very first elements of prosperity." His conception is that the hope of Russia lies in an improved condition and advancement of the peasantry. The weakness of the Russian system is in the backwardness of agriculture. The agriculturists constitute 78 per cent of the population, and for the most part are surrounded by the most unfortunate conditions. Their implements are of the most primitive character. The crop yield per cultivated dessiatin is lower than in any other country in Europe. Belgium, which ranks first, produces an average of 128.5 poods of grain per des siatin, a pood being equal to 36 pounds, while the Russian average is only 38.8 poods. Even this disparity does not indicate the full gravity of the case, for Russia produces less grain per head than is consumed per head in other countries, and at the same time she is the second grain-exporting country in the world.

This fact tells the story of her own deprivation, and it is emphasized by some particular inquiries. It is estimated that the people on the farms require from 20 to 25 poods of grain per head for their support and that of their live stock during the year, and these figures are much below the consumption in other lands. Yet it often happens that in a considerable number of provinces the harvest is far less than even this meager requirement. The result is that Russia is frequently afflicted with famines, that the consumption of bread has fallen off about 70 per cent, and that the number rejected from the military service through physical disqualification has increased 14 per cent within seven years. During the great famine of 1891, which extended over ten provinces, more than a million horses perished, leaving many of the peasants with no means of cultivating the land. The crop failure of 1898 did not cover so wide an area, but it was even worse where it prevailed. It left over 12,000,000 people in abject destitution and more than 8,000,000 suffering from actual famine. In 1900 and 1901 famine again desolated the land. All this entails chronic impoverishment. The arrears in the redemption of the land on the part of the former serfs are constantly increasing, and the economic conditions which affect them are growing worse.

The amelioration of this situation lies at the foundation of the present agitation for political reform and enlarged freedom. Undoubtedly, the popular restiveness has been quickened by the war and its demonstration of the defects of the existing system; but the recent

striking manifestations are only the sudden culmination of a movement which has been in progress for some time. To understand it we must grasp some fundamental elements of the Russian polity. Russia presents a curious paradox. Theoretically it combines the most extreme autocracy with the most extreme democracy. The great body of the people are divided and organized into "mirs," or communes. The mir is what we would call the township organization. Land is held in common and is apportioned for cultivation among the families of the mir according to their respective needs. The communal assembly makes the apportionment and the periodical redistributions; it governs other questions relating to the land, the harvest and other local affairs, and its government is more like that of the New England town-meeting than anything else. As far as it goes, it is a perfect democracy. All the people assemble on the village green, under the presidency of the starosta, or village elder, and determine all questions within their scope by a majority vote.

The mirs are grouped into cantons or districts, and the districts elect representatives to the zemstvos, which are the provincial assemblies. Without going into minute details, all classes are represented. The ultimate elective bodies are not large in proportion to the total population, but they are distributed among peasants, individual landholders, merchants, nobles, and urban electors. In 361 district assemblies, with 13,196 members, 38 per cent were peasants, 35 per cent nobles, 15 per cent merchants, and the remainder officials or priests. The provincial assemblies or zemstvos have over 1,200 members in all, and they operate chiefly through executive committees, of which the nobles constitute far the larger proportion. The mir deals with the land, farming, and the immediate local concerns. The district assembly, which corresponds more nearly with our county organization, looks after roads, schools, sanitary matters, and like questions. The provincial assemblies have the care of prisons, hospitals, charities, main roads, mutual insurance, and other subjects of more than local range.

The zemstvos were among the reforms instituted by the liberal and enlightened Emperor, Alexander II. They were created in 1864, and sprang from a commission appointed for the purpose of "conferring more unity and independence on the local economic administration." Theoretically they went far toward establishing a system of local autonomy, but practically they have been largely nullified by the overruling power of the provincial governors, who stand for the bureaucracy. Their authority and independence have from time to time been curtailed. Nevertheless, in their form as local representative assemblies, even with their limited electorate and scope, they furnish the basis and nucleus for wider representative institutions. Their liberal spirit and independent purpose have been the most characteristic features in the new reform movement.

In January, 1902, the present Emperor created a Central Committee of Agriculture, under the presidency of M. Witte, to consider the measures necessary to meet the existing difficulties. This body was supplemented by local advisory committees, which, rather by local choice than by central design, were made up largely from the zemstvos. The majority of these committees made some significant recommendations. They urged that elementary education should be increased; that zemstvos should be established in provinces where they did not exist, and made more representative, with larger powers; that the system of village communes should be reconstructed so as to give the peasants equality with others, and that free discussion of economic questions should be allowed.

A little later a memorandum was presented to the Czar recommending that their old powers should be restored to the zemstvos, that they should be arranged in groups, and that these groups should elect delegates to a central or national zemstvo.

The effect of these various demonstrations was seen when in February, 1903, the Czar issued a manifesto holding out high promise. He declared that the fundamental principle of property in common must be held inviolable, but he said that relief for the individual must be found, and added: "A reform is to be effected by local representatives in provincial government and district administration." These assurances were neutralized when the influence of Witte waned and the reactionary Plehve gained more power; but they and the manifestations which led to them were the forerunners of the more impressive demonstrations that have recently been witnessed. The meeting of the zemstvo presidents at St Petersburg in November last was in many respects the most remarkable assemblage in Russian history. It was almost like a states general. It put forth a declaration of principles which is equivalent to a demand for a national representative assembly with political voice and rights and with a direct advisory part in legislation and government. It plainly declared that there is an estrangement between the government and the people; that it is due to fear of popular initiative, and that it has led to great wrongs in the arbitrary bureaucratic system which has come between the throne and its subjects. It calls for the overthrow of this centralized administration of local affairs; for independent legal tribunals for the protection of personal rights; for free speech, free press, and free conscience; for equal civil and political rights for peasants; for the greater independence and extension of the zemtsvo institutions, and for national representation through an elective body which shall participate in legislation.

These demands are unprecedented in Russia, and their concession would inaugurate a revolutionary change. It was not to be expected that they would all be granted at once. The ukase which the Czar has issued in response to this call marks a large advance. It charges the Council of Ministers with the duty of framing measures to secure equal rights to the peasants; to safeguard law and unify judicial procedure for the protection of personal rights; to assure a more independent and complete administration of local affairs through local institutions; to deal with state insurance for workmen; to reduce the discretionary authority which has bred the administrative process; to promote larger religious toleration, and to provide greater freedom of the press. This is a long step in liberalism. It does not establish representative institutions; it does not provide for elementary education; but it does look toward a larger local control of local affairs, toward the relief of the peasants from the rigorous conditions which surround them, and toward the removal of the arbitrary restrictions which now burden the people; and the ukase itself distinctly treats these reforms as the beginning of "a series of great internal changes impending in the early future."

In considering the character, trend, and methods of these changes the peculiar conditions of Russia must ever be remembered. Whatever advance has been made there up to this time has come from the top and not from the bottom. The great mass of the people are simple, illiterate, and inert. The disturbances which have occurred from time to time have been mostly on the surface. The great deeps have not been moved, though the caldron is now seething as never before. The new industrial conditions of recent years, to which reference has been made, have produced a class of

workmen and artisans in the cities who are more alert than the supine peasantry and who are the source of the present discontent and uprising.

The whole fabric of society, it must also be borne in mind, rests upon the church which is the very foundation of the state and to which in its ritual and observances all, from the Czar to the humblest moujik, are supremely devoted. The first need of the people is economic improvement and their release from the harsh conditions of their restricted communal life. The report of Witte on the elevation of the peasant contemplates some reconstruction of the mir and the opening of broader callings and opportunities to those who are practically bound to the soil. It is urged with force that real social emancipation cannot come without political enfranchisement. The one will undoubtedly promote the other, and under the quicker impulse of these later days the nation is moving forward to both.

Russia is passing through the dark valley of deep trials. She is paying the appalling cost of grievous mistakes; but enormous as that cost is, it will still be cheap if, through these bitter experiences and this new awakening, the great empire shall be put upon the higher pathway of wiser counsels and liberal advancement. The history of Russia is a varied story. It is illuminated with the progressive measures of the great Emancipator. It is darkened with the shadows of Kishinev and the Finnish oppression. The far-reaching reforms which are now dawning on the nation give promise of a new and more hopeful era. Russia has prodigious recuperative power. She was prostrate after the Crimean war, but soon recovered her strength. She was humiliated and straitened after the Turkish war, but started again upon a new career. She is patient, tenacious, and persistent; she has the traditions and the indomitable faith which have come down from Peter the Great; she has the vast though dormant resources of imperial domain and power; and if through the disasters she is now suffering she shall throw off the shackles of the bureaucracy that have weighed her down and come to share the progressive spirit of the age, she will through present tribulations and final regeneration enter, as we hope she may, on a new and brighter epoch.

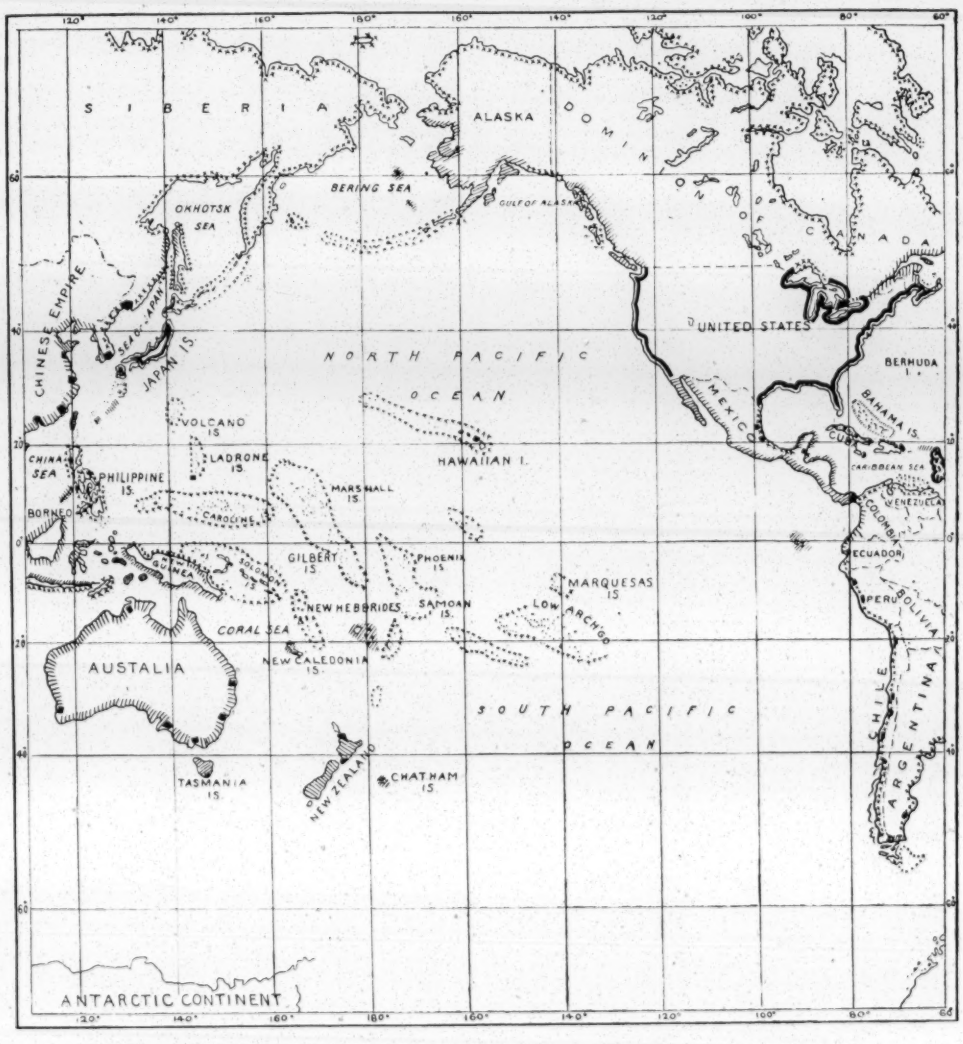
MARINE HYDROGRAPHIC SURVEYS OF THE COASTS OF THE WORLD*

By George W. Littlehales

THE accumulated stock of marine hydrographic knowledge in its availability for the construction of navigational charts of the coasts of the world is divided into four classes for the purposes of this communication. Upon the accompanying world chart the extent of coast line comprised within each of these four classes is indicated by appropriate symbols depicting the coasts that are completely surveyed, those that are incompletely but serviceably surveyed for purposes of navigation, those that are explored for purposes of navigation, and those that are unexplored for purposes of navigation.

It should be made clear with reference to those coasts which are classed as being completely surveyed that, excepting in rare instances, no greater completeness

*An address to the Eighth International Geographic Congress, September, 1904.



Map showing the Condition of the Coast Surveys of the World

has been attained in the portrayal of the forms and characteristics of the strip of the sea bottom which borders the coast than is yielded by measurements obtained by dropping a sounding-plummet at close intervals, and that nearly all coasts and harbors, whatever may be the initial completeness of the surveys, require reëxamination in the course of time to disclose the altered conditions that are produced by natural agencies and artificial developments.

It will not escape attention that while there is a comparatively small total extent of completely surveyed coast which bounds the world's seats of enlightenment and wealth in the Northern Hemisphere, the extent of coast that is unex-

Map showing the Condition of the Coast Surveys of the World

plored for purposes of navigation is yet smaller and is almost confined to the frozen regions of the earth, which are unvisited by commerce and unpeopled. A prominent feature of the investigation and one which can not fail to bring a realization of the great responsibility resting upon navigators and the skill and caution required of them in the navigation of coastal waters in nearly all parts of the world is the immense extent of the coast line which, while sufficiently known to be approached, can not be navigated with security.

It is in general useless for the nautical surveyor of the present day to devote himself to the rapid reconnaissance of a coast in the manner that proved so ac-

ceptable in the middle of the last century, for such a survey would not now prove beneficial with reference to any but the unexplored regions.

The parts of the world that have been completely surveyed and the parts about which, from the standpoint of the marine hydrographer, nothing is known are equally beyond our concern at present, for on the one hand the needs of commerce and navigation have been met and on the other hand commerce and navigation have as yet no needs. It is to the vast extent of the coasts of the world concerning which marine hydrographic knowledge exists in varying degrees of incompleteness that we should address ourselves with a view of directing attention to the faults which may be corrected and to the wants which may be supplied.

Leaving our own completely surveyed Atlantic seaboard, we come at once among the oldest colonies in the Western Hemisphere and in a sea of great present and prospective importance, upon coasts concerning which there is no adequate information for the construction of charts and the guidance of shipping. The coasts of the Island of Haiti, outside of the more important ports and harbors, are very imperfectly charted. Our knowledge of the harbors of Cuba has been lately much improved, but the sections of coast connecting these harbors is not yet well represented. No better portrayal of the north coast of South America from Panama to Trinidad has ever been afforded than that which resulted from a cursory examination made in the early part of the last century. There are doubtless many places along this coast where future surveying operations will develop useful anchorages for the improvement of commerce and the safety of vessels. The ports leading to many of the important maritime centers of Brazil have been efficiently surveyed, but the general approaches to the coast are not completely developed. In the Rio de la Plata navigation has been rendered fairly safe, but of the intervening coast, until the Strait of Magellan is reached, it may only be said that, beyond several isolated local surveys lately executed by the Argentine government, nothing has been done since the general examination in 1830. The efforts of British and Chilean hydrographic surveyors have effected much improvement during the last generation in the charts of the Strait of Magellan and throughout the waters of Chile, although the whole labyrinth of channels in southern Chile is still inadequately known for the purposes of the many steamers that are continually passing through; and with reference to the entire western coast of South America, the efficient surveying operations have clustered around local developments that were taking place here and there, leaving no general survey of the whole coast by which it can be laid down in sufficient detail.

The surveys of the immediate approaches to Panama, although imperfect, are serviceable; and the same may be said of the Central American and Mexican coasts which connect the Republic of Panama with the completely surveyed Pacific coast of the United States. Of the coastal waters in the northeastern Pacific much more is known in relation to the waters of the British dominions than with reference to the Alaskan coasts. Indeed the marine hydrographic surveys of Alaska are as yet very incomplete, especially in the Aleutian Islands, where many coasts remain barely explored. Russian Siberia and Korea have for the most part only been hydrographically explored; but nearly all of the coasts of the Empire of Japan have been completely surveyed and charted, and the coasts of China, together with the China Sea, where British surveying ships have worked continuously for fifty years to put in their right positions the multi-

tude of rocks and shoals which encumber this region, are now well known. Much, however, yet remains to be done on the eastern and southern confines of this sea. Only the most important harbors and sections of coast in the Philippines and the Dutch East Indies have been well charted. Parts of Tonquin and the southern, and especially the eastern, passages into the China Sea need much additional examination in detail. Australia and New Zealand are enveloped with good nautical charts, which are constantly being amended as new developments give rise to increased needs for more detailed surveys, and most of the important harbors and the thickly inhabited maritime sections have been quite completely done. The Coral Sea, or what is termed the outer passage between Australia and the Indian Ocean, is now much improved beyond its former state, owing to the necessity of providing more direct routes than those which were formerly followed, and most of its dangerous reefs are now set down in the charts. British India is better surveyed than many other parts of the best-known coasts of the world, and the shores of the Red Sea and the Mediterranean have been minutely surveyed excepting in a few parts where minor details are not now important.

Of the coast of Africa, aside from that portion which fronts on the Red Sea and the Mediterranean, the most vaguely charted portion is that of Somaliland, and the most completely charted parts are embraced in that well-surveyed section, including Madagascar, which extends southward from Zanzibar around the Cape of Good Hope to the regions of Table Bay. The whole of the west coast can now be laid down with closeness to its true position on the face of the globe, and while some parts of it have been merely explored by the nautical surveyor, many other parts are better known, and some of the harbors and off-lying islands have been surveyed with considerable approach to completeness.

The coasts of Europe, excepting the Spanish peninsula and those parts bordering on the Arctic Ocean, are completely surveyed, and an important center of activity in marine hydrography has for many years existed in Great Britain, resulting not only in elaborate surveys of the waters of Great Britain and Ireland, but in meeting the demand for reliable nautical charts in every part of the British Empire and in whatever other parts of the world British trade has been active or springing up.

Nearly a century has now elapsed since the close of the era of discoveries among the vast groups of islands and coral reefs with which the immense area of the Pacific Ocean is studded, and the chaotic state of geography at that time, in which it was sometimes impossible for discoverers to return to the islands discovered, has given place to a state of order at the present day. The ships of all the great maritime nations have contributed in a greater or less degree to this advance by fixing the correct geographical positions of individual islands, by surveying harbors and anchorages in the various groups, and by disproving the existence of many supposed rocks and dangers which were set down in the older charts from reports of former navigators, often doubtless based upon misleading appearances of the sea.

But important as is the surveying work that has already been accomplished in the Pacific, it is only the beginning of that which is to come. There is scarcely an island group in the whole of Oceania that is completely charted. The great work that remains to be done here ought to progress more rapidly in the future, since all these lands have at length been parceled out among leading nations of the world.

THE WONDERFUL CANALS OF CHINA

By U. S. Consul George E. Anderson, Hangchau, China

THERE are several features in the canal system of China, especially of the Imperial or Grand Canal, which can be studied with profit by the people of the United States. One of these is the use of the canal for the production of food in addition to its uses as a means of transportation. Allied to this is the use of the muck which gathers at the bottom of the waterway for fertilization. Another is the use of every particle of plant life growing in and around the canal for various purposes.

The Chinese secure a vast quantity of food of one sort or another from their canals. To appreciate the exact situation with respect to the waterways, it must be realized that the canals of China cover the plain country with a network of water. Leading from the Grand Canal in each direction are smaller canals, and from these lead still smaller canals, until there is hardly a single tract of 40 acres which is not reached by some sort of a ditch, generally capable of carrying good-sized boats. The first reason for this great network is the needs of rice cultivation. During practically all of the growing season for rice the fields are flooded. Wherever a natural waterway can be made to irrigate the rice fields it is used, but, of course, from these to the canals or larger rivers there must be waterways. Where natural streams cannot thus be adapted the Chinese lead water in canals or ditches to the edge of their fields and raise it to the fields of rice by the foot-power carriers which have been described so often by tourist writers. However the water is supplied to the rice, it is evident that there must be a waterway leading to the field and back to a principal stream, which is generally a branch canal. These waterways naturally take up a considerable portion of the land, and the Chinese make as profitable use of them as of the land itself.

The first use of the waterways is for fishing. The quantity of fish taken from the canals of China annually is immense. The Chinese have no artificial fish hatcheries, but the supply of fish is maintained at a high point by the fact that the flooded rice fields act as hatcheries and as hiding places for the young fish until they are large enough to look out for themselves. In the United States this fish propagation annex to the canals is probably neither possible nor needful in view of the work done by the state and national bureaus; but in China it is nothing less than providential.

Along the canals in China at any time may be found boatmen gathering muck from the bottom of the canal. This muck is taken in much the same manner that oysters are taken by hand on the Atlantic coast In place of tongs are large, bag-like devices on crossed bamboo poles, which take in a large quantity of the ooze at once. This is emptied into the boat, and the process is repeated until the boatman has a load, when he will proceed to some neighboring farm and empty the muck, either directly on his fields—especially around the mulberry trees, which are raised for the silk-worms—or in a pool, where it is taken later to the fields. From this muck the Chinese farmer will generally secure enough shellfish to pay him for his work, and the fertilizer is clear gain. The fertilizer thus secured is valuable. It is rich in nitrogen and potash and has abundant humus elements. This dredging of the

canals for fertilizers is the only way by which the Chinese have kept their canals in reasonably good condition for centuries. The fertilizer has paid for itself both ways. Recently there were complaints filed at Peking that the ashes from the steam launches plying on the canals were injuring the muck for fertilizing purposes, and the problem has been considered a serious one by the Chinese government.

In addition to securing fertilizers from the canals, and thus keeping the canals in condition, the farmers help keep them purified by gathering all floating weeds, grass, and other vegetable debris that they can find upon them. Boatmen will secure great loads of water plants and grass by skimming the surface of the canal. The reeds growing along the canals are used for weaving baskets of several grades and for fuel. In short, no plant life about the canal goes to waste.

Where there are so many canals there is more or less swamp ground. In China this is utilized for the raising of lotus roots, from which commercial arrowroot is largely obtained. There is no reason why much of the waste swamp land in the southern portion of the United States should not be used for a similar purpose, and the commercial returns from a venture of this sort in that part of the country ought to be satisfactory. Where the canals of China widen, by reason of natural waterways or for other reasons, the expanse of water not needed for actual navigation is made use of in the raising of water nuts of several varieties, especially what are known as water chestnuts. These nuts are raised in immense quantities. They are, strictly speaking, bulbs rather than nuts. They are rich in arrowroot and are prolific, an acre of shallow water producing far more than an acre of well cultivated soil planted in ordinary grain or similar crops. These nuts, also, could be produced to advantage in the United States where there is land inundated for the growing season to a depth which will give ordinary water plants a chance to thrive and which is not capable of being drained for the time being. The nuts or bulbs are toothsome when roasted, and are wholesome, but probably would be more valuable in the United States for the manufactured products which can be secured from them.

There are duck farms all along the canals in China. These are profitable. Chinese canals, as a rule, considering the population upon them and their varied uses, are cleaner than canals in the United States. There are few if any factories to contaminate them. The Chinese use of certain sewage for fertilization also prevents contamination to a great extent. The canal water is used for laundry, bath, and culinary purposes indiscriminately. A canal in the United States could never be what it is in China, but the Chinese have a number of clever devices and ideas in connection with their canals which can be adopted in the United States with profit.

The Grand Canal system in China has existed in almost its present shape since about the time Columbus discovered America. The Grand Canal itself, extending from Hangchau to Pekin, is about a thousand miles long. Much of it is banked with stone, and all of it is in such condition that with the expenditure of a little money the system could be put upon a modern and effective basis. As it is, the canal handles practically all the internal trade of China, and this trade is far greater than its foreign trade. The coming of railroads will affect the canals somewhat, but not so much as may be imagined, for the railroads will very largely build up a trade of their own. A little money will make China's canal system in the future what it has been in the past, the greatest on earth.

GEOGRAPHY AND CULTURE*

IT has been often remarked how much the various wars of the past ten years have educated the people in geography. Southeastern Europe, South Africa, the West Indies, the China coast, Japan, Korea, and Siberia have in their turn been "discovered" by millions of people who had previously entertained very hazy notions as to their existence on the face of the earth. Yet, rather singularly, there are more complaints today concerning the ignorance of geography among all classes, high and low, than ever before.

The universities, colleges, and schools are under more criticism than hitherto for their alleged failure to give to geography, broadly considered, its proper place in their courses of study. A year or two ago Mr Bryce delivered an address before a geographical society in England in which he emphasized the importance of geography in any scheme of education or culture. Lord Salisbury, not long before he died, surprised his countrymen by saying that many of their misconceptions concerning international questions originated in the misleading scales of the maps of different countries and continents. It needs but a moment's reflection, indeed, to be convinced that while people in general have lately increased their stock of geographical knowledge, owing to these sensational wars and the closer jostling of the nations, we have only begun to realize how ignorant we are concerning the earth we live upon.

The great extent of the average person's real ignorance of geography is almost invariably shown whenever he begins to probe into some question of history or international politics. Very soon he discovers, rather to his surprise, that the whole matter may rest upon some simple fact of geography. A classic illustration is the discovery of America, which was the immediate result of the closing of the old Mediterranean trade routes to the Orient by the conquering Turks. Most people have a general idea that Columbus was seeking a new way to the Indies when he made his historic voyage, yet they never get far enough along to understand clearly why he was seeking that route. They do not know anything about the ancient routes through Asia Minor and around the Black Sea and what the Turks did to them. History cannot be intelligently understood, of course, without a clear knowledge of the geography of history. Huxley believed this so strongly that he never read a book of history or travels or international politics without an atlas by his side for constant reference. Yet most of the histories that are published even in our time are singularly deficient in good maps, and, strange to say, the great Cambridge series of modern history, planned by the late Lord Acton, contains not a single map in the first four volumes already printed.

Certain facts of geography account for very much of what goes on in our own time. The Boer war cannot be thoroughly understood unless one knows the peculiar relation that South Africa bears to India and Australia from the British point of view. The war between Russia and Japan is an insoluble mystery until one observes the position of Korea and the Sea of Japan with reference to the Russian outlet upon the Pacific. Why is Russia today such a despotism? Even that question should be answered in the light of the geography of the Russia of Ivan the Terrible and Peter the Great. What makes Ireland so poor? The climate, due to the island's geographical position with reference to the trade winds of the Atlantic, cannot be ignored in seeking an explanation of Ireland's position the past sixty years.

* From the *Springfield Republican*, December 18, 1904.

Why does Japan wish to expand in territory? We need only study the physical character of Japan to know. Why is Nevada such a backward state, and why is Arizona such an unpromising candidate for statehood? Here again geography can give an answer. Why did the negro race in central Africa remain for ages in an isolated, uncivilized, undeveloped condition? To answer that fully one must take account of the Sahara desert on the north and the great forest belt which follows in a wide, deep margin the west African coast.

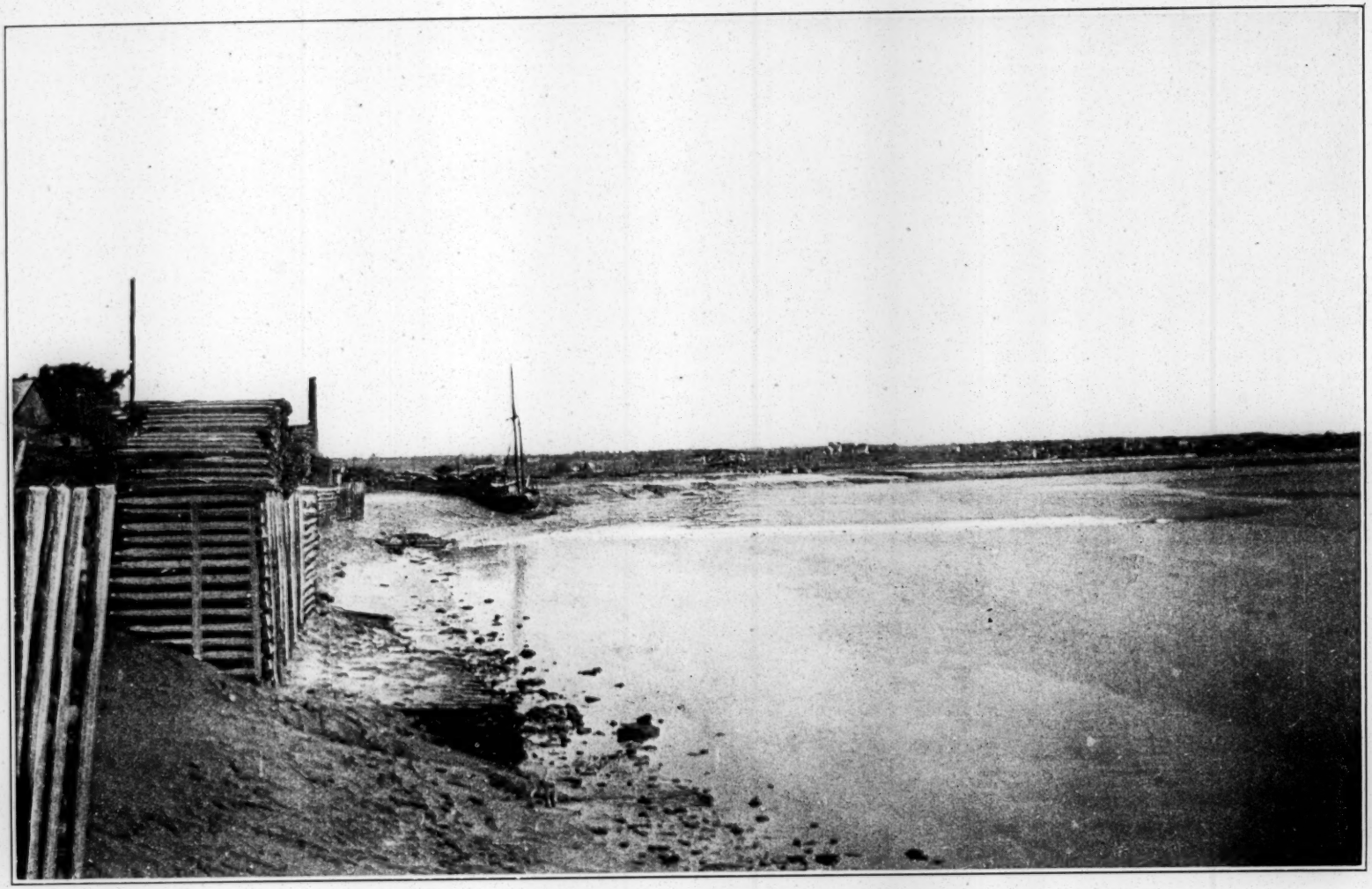
Yet geography, with most people, has always been a "dry" study. Just why this is so might be discussed, perhaps, so as to yield interesting conclusions. Possibly, as taught for so long in the past, it was too unreal, too make-believe, too artificial to arouse interest, especially the interest of those with little imagination. The north was always up, the south down, the east at the right and the west at the left of the page. To be sure, the earth was round, with flattened poles, because the book said so; yet what one in a thousand, since the globular condition of the earth was accepted as a fact by the civilized world, has easily comprehended the significance of the great and small circles as to distances over continents and oceans? Then, too, the misconceptions one may draw from the ordinary maps are enormous, as Lord Salisbury intimated so strongly. We are so accustomed to large maps of our little corners of the earth that when we see maps of Asia, or Africa, made of the same size, our ideas as to the extent of those regious go hopelessly astray. When some one comes along and tells us how many Frances or Germanys or Englands could be embraced within the boundaries of Tibet, we are well-nigh upset. When President Roosevelt talks about "the mastery of the 'Pacific,'" not one American in 500 can conceive the proposition in terms of geography, and geography has a tremendous lot to do with international politics.

It is said that geography is still largely a monopoly of the German schools; in England, they are poorly off, according to the complaints lately made in the London press. It is encouraging, however, to note a growing insistence everywhere upon fuller geographical knowledge and more nearly correct geographical ideas. No one can be a man or woman of real education and culture in the future to whom geography, in no narrow sense, is virtually a closed book.

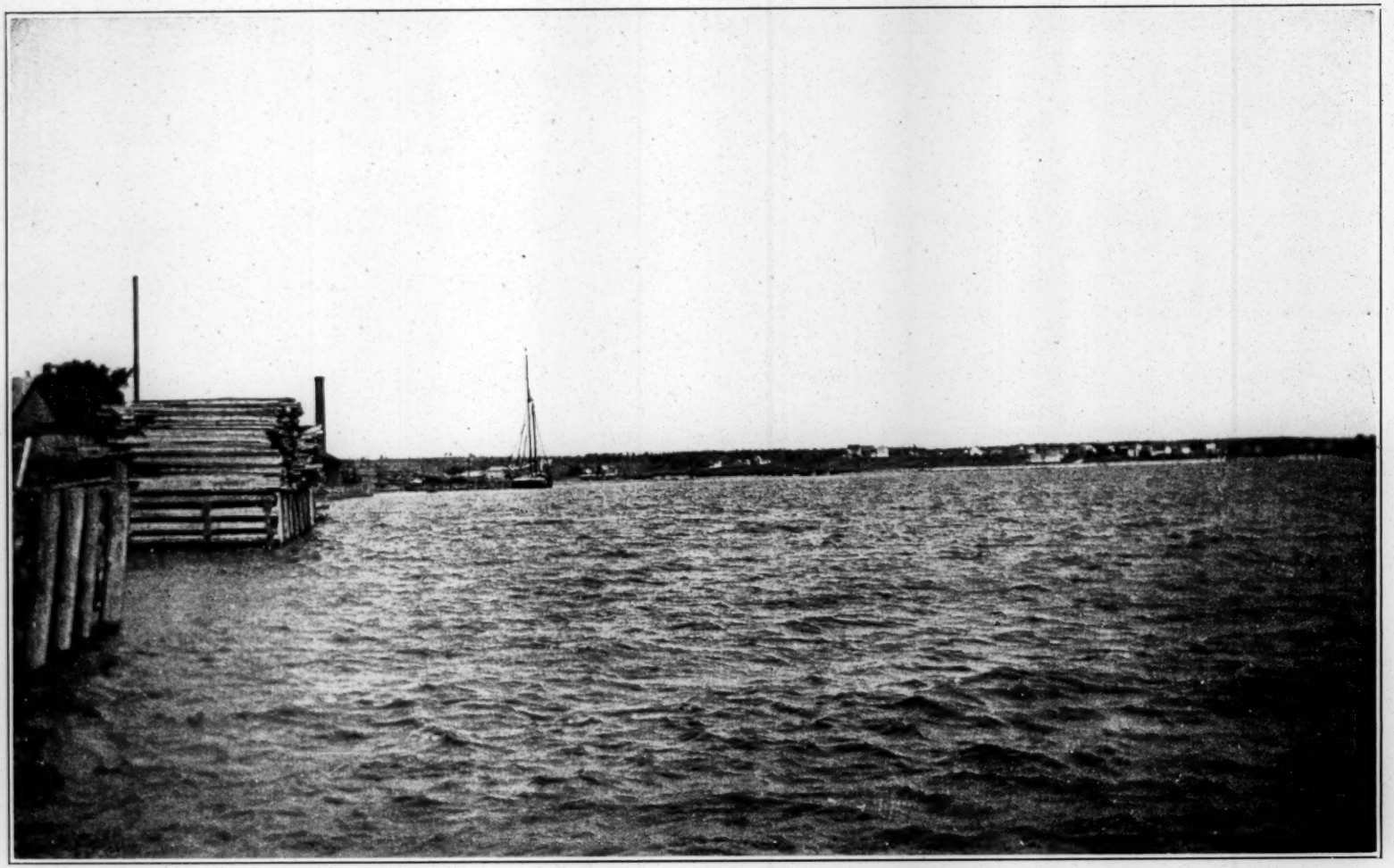
TIDES IN THE BAY OF FUNDY

THE accompanying plates of high and low tides in the Bay of Fundy are enlarged from photographs taken by Mr Roland Hayward, of Milton, Mass., in the summer of 1903. The views are of double value—first, in showing tides of unusual strength, and, again, in being taken from the same points for both high and low tides. The following general statements are from an article by Chalmers in the Report of the Geological Survey of Canada for 1894 (1895):

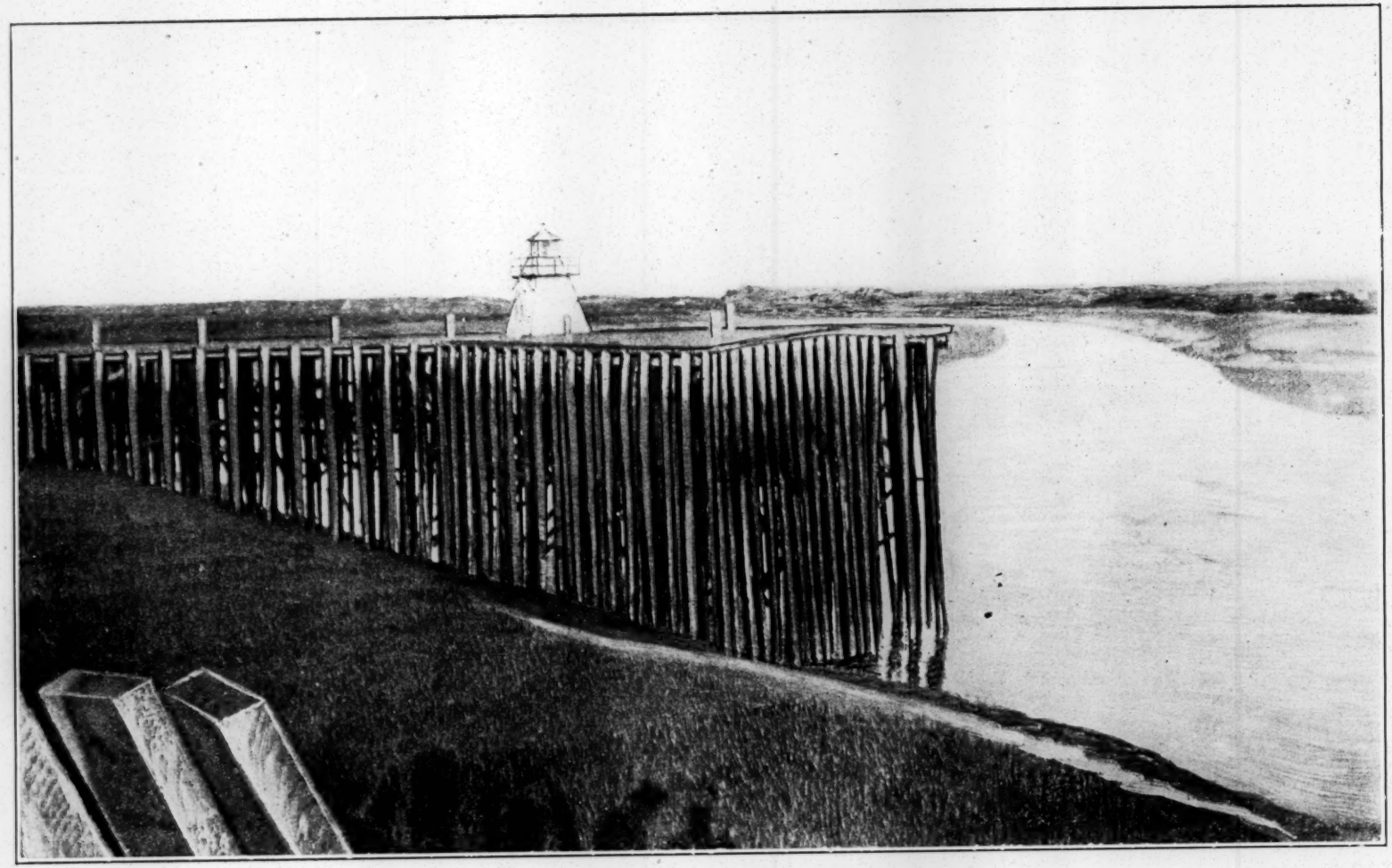
The mouth of the bay is 48 miles wide and from 70 to 110 fathoms deep. The bottom rises at a rate of 4 feet to a mile for 145 miles, to the head of the bay. On the coast near the mouth the spring tides vary from 12 to 18 feet. Within the bay the spring and neap tides are as follows: Digby Neck, 22, 18; St John, 27, 23; Petitcodiac River, 46, 36; Cumberland Basin, 44, 35; Noel River, in Cobequid Bay, 53, 31. The last named is, according to Chalmers, the greatest tidal range authentically



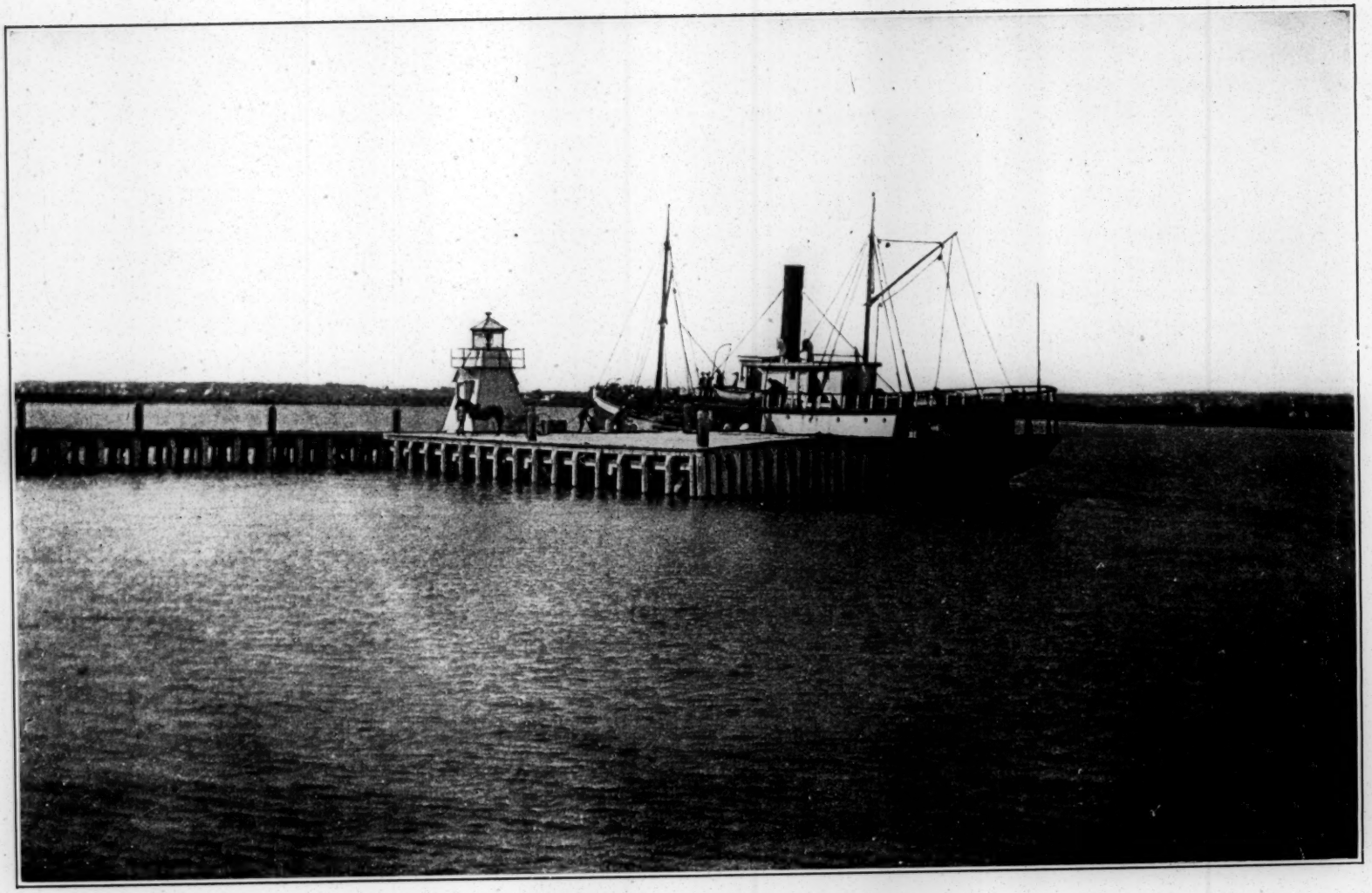
The Bore coming up the Petitcodiac River at Moncton, N. B.



High Tide on the Petitcodiac River at Moncton, N. B.



Low Tide on the Gaspareaux River, Wolfville, N. S.



High Tide on the Gaspareaux River, Wolfville, N. S.

reported for any part of the bay. At the head of the bay high tide is about 20 feet above mean sea-level. Low tide is as much below. The tidal bore is seen in Maccan River, entering Cumberland Basin; but it is stronger in Petitcodiac River, entering Shepody Bay. It is best seen at Moncton, where the first pair of views is taken.

Mr Hayward gives the following details:

The Petitcodiac River turns at Moncton from a northeast to a southeast course, then entering the northwestern branch of the bay. The mud flats are three-quarters of a mile wide at Moncton. The retiring tide leaves them covered with ripple-marks. The low-tide view was taken at 10.05 a. m., August 9, 1903, looking easterly. Here the foaming and roaring bore advances against a swift fresh-water stream, rising rapidly. Its height was about 3½ feet; its progress was 5 miles an hour. High water, as shown in the second view, is reached about three hours after the arrival of the bore.

The second pair of views was taken at Wolfville, on the eastern arm of the bay near the mouth of the Gaspareaux River, on September 7 and 8, 1903. The piles in the pier are stated to be 60 feet high. The great inconvenience attending so strong a range of tide may be imagined.

It may be well to recall a feature of the Bay of Fundy tides set forth by M. S. W. Jefferson a few years ago in his articles in this magazine, to the effect that the Fundy tides are practically synchronous from the mouth to the head of the bay, while the Chesapeake tides, for example, are progressively later and later from mouth to head; but the estuaries at the head of the Bay of Fundy have progressive tides, as in the Petitcodiac. The synchronous "swash" tides of the bay may be easily imitated in a model of an irregular shore on which a shallow sheet of water lies. Tide-like oscillations in the water may be made by an oscillating plunger; and when the proper period of oscillation is chosen, the tide in a funnel-shaped bay will have small range at the mouth and great range at the head, and the time of high or of low tide will be essentially synchronous all along the bay sides. At the same time a neighboring bay of different form may have progressive tides whose advancing waves may assume the form of a bore if the proper variation of breadth and depth of channel is given.

W. M. D.

FRENCH CONQUEST OF THE SAHARA*

BY CHARLES RABOT

EDITORIAL SECRETARY OF "LA GEOGRAPHIE," MEMBER OF THE COUNCIL OF SOCIÉTÉ DE GEOGRAPHIE DE PARIS

TO traverse the Sahara from north to south, to join Algeria to the Sudan through the great desert of North Africa, and to subjugate the nomads who wander through that immense region has been one of the principal aims of France in recent years, and one which she has at length attained at the price of long and persevering effort. The hostility of the Touaregs was for a long time an obstacle. Established in the oases scattered over the Sahara, these Berber fanatics and brigands were accustomed to scan the whole desert, and

* An address to the Eighth International Geographic Congress, September, 1904.

as soon as they spied a caravan to fall upon it to rob and massacre. Often, too, they were wont to attack the tribes of the extreme south of Algeria, who had already submitted to French influences.

After the disaster to the Flatters mission in 1881 and several other outrages committed by the Touaregs, the French military authorities had postponed for a while all further desire to penetrate into the Sahara and remained simply on the defensive.

During this period of official inaction, M. Foureau accomplished a series of very fruitful expeditions in the desert regions south of Algeria. From 1883 to 1897 he traveled no less than 13,200 miles, of which 9,600 were in regions entirely unknown.

Not only did M. Foureau notably augment our geographic knowledge by this journey, but he inaugurated a mode of traveling which has been very fruitful for the exploration of the Sahara. Instead of being accompanied by a heavy caravan, like preceding missions, this traveler adopted the mode of life and transport of the natives, taking with him only a few faithful Arabs. His little troop was mounted on "meharis," used by the Touaregs—rapid camels, which are to the ordinary camels of the caravan what race-horses are to cart horses. Thanks to the mobility of his caravan, M. Foureau could perform long raids without being attacked by the Touaregs. Meanwhile, from 1890 to 1892, a French officer, Colonel Monteil, accomplished the crossing of the Sahara from Tchad to Tripoli by the caravan route.

The French, however, had never abandoned the idea of a junction of Algeria to the Sudan. In 1896 a member of the Geographical Society, M. Renoust des Orgeries, encouraged this idea by giving the society $50,000 to organize an expedition to carry out this program, and in 1899 M. Foureau received permission to traverse the Sahara and to make his way through the desert to the French possessions in Central Africa. To ensure the safety of his caravan and to compel a respect for the French flag from the brigands of the Sahara, the government gave M. Foureau a numerous military escort, commanded by Major Lamy.

This Foureau expedition started from Ouargla (in South Algeria) at the end of October, 1898, and a year later (November 2, 1899) arrived at Zinder, at the northeast extremity of French Sudan. In the April following, after having gone round Lake Tchad by the north and east, the expedition had effected a junction with the French troops upon the Chari, the principal affluent of the Tchad.

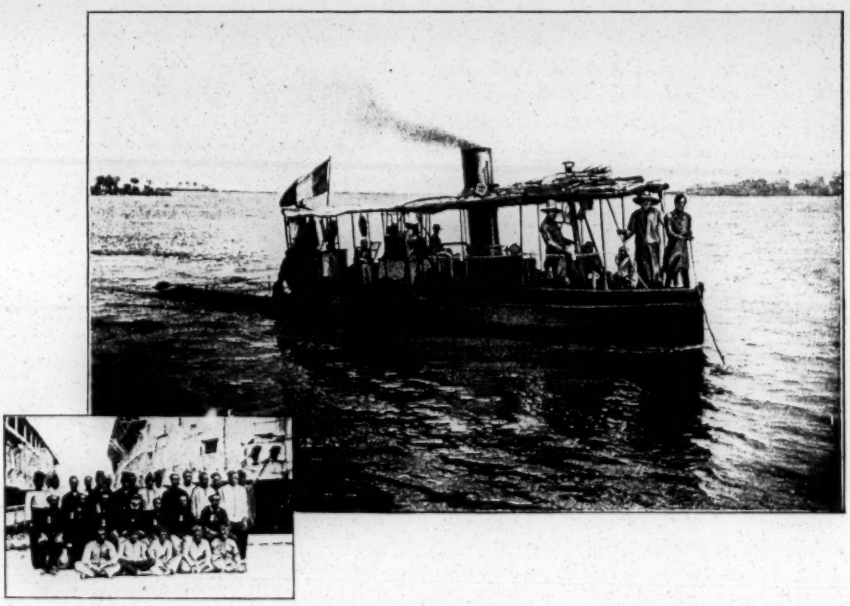
The march of the expedition was very slow and painful in consequence of the enormous caravan track behind it. Part of its camels soon succumbed to the fatigues of the journey, and it was impossible to purchase new beasts of burden from the nomads. The Touaregs, confident of their strength, threw themselves at various times against the little troop; but, having learned in these encounters that they could not be victorious, they abandoned active hostilities and limited themselves to creating a complete dearth of supplies around the explorers. It was only through the energies of M. Foureau and of the military chiefs that the expedition was able to get along at all.

The slowness of this journey has had very favorable results from the scientific point of view. It has permitted M. Foureau to acquire a very complete knowledge of the country and to collect a very rich harvest of observations of interest to all fields of geography. A great work setting forth these scientific observations is in course of publication and is being offered to all important geographic societies.

The Foureau mission opens a new era in the French penetration of the Sahara.

At the moment when this expedition was setting out the French government gave up the defensive attitude, and, abandoning the merely defensive policy observed since the Flatters mission in 1881, decided to extend further southward the zone of French influence, which then did not pass 20° latitude north. On the 28th of December, 1899, M. Flamand, a naturalist, was instructed to make a study of the region which it was proposed to annex, and was attacked at In-Mediterranean to the northern curve of the Niger at Timbuctoo.

This military advance has had interesting results from the point of view of geography. An excellent map on the scale of 1:250,000 has been made by Lieutenant Nieger of the whole region of Touat and Tidikelt, hitherto imperfectly known. Moreover, M. Flamand has published interesting notes on the morphology and geology of this part of the desert. To ensure protection of



Scenes on Lake Tchad

Sala. Immediately the French troops advanced on their "meharis," commanded by Captains Germain and Pein, two brilliant Sahara officers. Some months later the French occupied the chain of oases of Gourara, Touat, and Tidikelt, more than 300 kilometers in length, which runs along the subterranean courses of rivers descending from the high plateaus of Morocco and Algeria. In this way the French had advanced nearly half the distance from the

the oases thus acquired against the incursions of the Touaregs, the military authorities recognized the necessity of abandoning the old mistake of simply remaining on the defensive. In order to assure the tranquillity of the country, it was necessary at the first attack from the brigand tribes to pursue them vigorously through the desert, and not to give up until a sharp lesson had been inflicted.

This result could only be obtained by

a very mobile and acclimatized troop. It was decided therefore to undertake the creation of troops mounted on "meharis" and composed of natives under the command of French officers. This organization was inspired from that of the famous "dromedary companies" instituted by Bonaparte in Egypt, and by that of the "camel corps" recently adopted in the Sudan by the British army.

Since that time the French troops have been on an equality of speed and mobility with the Touaregs, while their superiority of arms ensures victory even against superior numbers.

These Saharan troops once organized, the officers commanding the extreme southern posts upon the Algerian frontier undertook long raids into the Sahara, traversing and surveying vast unknown regions and at the same time acting as a vigilant police. On March 26, 1901, the Touaregs having come to rob the people of Tidikelt, Lieutenant Cottenest started with 130 native troops and reached the mountain mass of the Hoggar and inflicted a severe lesson upon the brigands, returning to In-Sala after having traveled 1,000 miles in 62 days in a country entirely hostile. The same year, from the 16th of May to the 15th of June, Major Laperrine explored the Mouydir, a plateau surrounded by valleys from 200 to 300 meters deep and containing an abundance of water, wood, and excellent pasture.

Some time later, in 1902, Lieutenant Guilho-Lohan returned to the Hoggar plateau and pushed south to 22° latitude north. In 1903 Lieutenant Besset effected a raid of 750 miles in the south, and some months later Major Laperrine, accompanied by Professor Gautier, directed a new reconnaissance in the Mouydir and the Ahnet. At the same time Captain Pein effected a raid round the Temassinine in the region situated farther east.

These different expeditions have completed and transformed the situation of the Sahara. The Touaregs, finding themselves chastised for the smallest act of rapine and always overtaken in their haunts, have now given their submission to Captain Metois, commanding at In-Sala. Only the tribe of Azguers, which wanders in the eastern Sahara, has as yet refused to accept French domination.

Accordingly a new and decisive operation was undertaken. At the commencement of February, 1904, Major Laperrine, quitting In-Sala at the head of a troop of "meharistes" and taking his route south, succeeded in traversing the Sahara and meeting a second troop of "meharistes" which had set out from Timbuctoo. In this way was effected the junction of Algeria with the Niger, previously accomplished by M. Foureau, but now by a more eastern route.

In this expedition Major Laperrine was accompanied by an astronomer, M. Villate. From a geographical point of view these raids have had very important results. The officers who have commanded them have brought back precise methods and numerous observations of interest. As a result of the reconnaissance in which he took part in 1903, Professor Gautier has made a geological map of Mouydir and Ahnet, in the very center of the Sahara.

The junction of the parties from In-Sala and Timbuctoo took place on April 18, at the well of Tioniaoune by 20° 10′ north latitude. The party from Algeria, under Commandant Laperrine, had come through Inzize and Timissao. After he succeeded in joining hands with the southern party, the commandant pushed a little farther south, as far as the well of Tin Zaouatem by 19° 57′ north latitude, but soon resumed the journey northward to In-Sala, following a fresh itinerary. Scarcity of water and the heat (it was in May) made the

homeward journey very trying, part of the men having to travel as far as 320 kilometers with hardly any water. News received from this expedition points to the extension southward of the volcanic formations discovered by M. Gautier in Mouydir.

Thanks to M. Foureau and to the officers commanding the posts of the extreme south of Algeria, considerable progress has been accomplished by the new method of exploring the Sahara by the employment of "mehara" (singular of "mehari"). This camel can bear, besides his rider and his arms and accoutrements, 30 days' victuals and two skins of water. With this load he can march from 3 to 3¼ miles an hour and amble at a pace of 5 miles. In the raid executed in 1903 by Commandant Laperrine and Professor Gautier 69 miles were traversed in 29 hours.

One has no need for anxiety as to feeding the mehari; the desert flora suffices for its food, and in summer it can endure 5 days without drinking, while when plants are green it can go without water for 18 or 20 days.

By this method of penetration in the Sahara, M. Foureau and these French officers have there accomplished progress as important as that effected by Nansen in his Arctic exploration. By adopting the means of locomotion and of existence of the Polar peoples, the Norwegian explorer gained a memorable victory. In the same way, by borrowing from the inhabitants of the Sahara their mode of life and locomotion, the French have triumphed over the obstacles which the nature of the soil and of the inhabitants had set against the exploration of the great desert of northern Africa.

OBSERVATIONS ON THE RUSSO-JAPANESE WAR, IN JAPAN AND MANCHURIA*

BY DR LOUIS LIVINGSTONE SEAMAN

THE Japanese soldier has been taught how to treat his intestines, and consequently his intestines are now treating him with equal consideration. His plain, rational diet is digested, metabolized and assimilated. It is not an irritating, indigestible, fermenting mess, acting as a local irritant and producing gastritis, duodenitis, enteritis, colitis, hepatitis, and the long list of inflammatory intestinal processes with which we were all so familiar in the hospital wards at Camp Alger, Chattanooga, Tampa, Cuba, Porto Rico, Montauk Point, &c., in 1898.

The great hospitals are there, interne, contagious, and infectious departments, their conspicuously empty beds voicing more eloquently than words the most important lesson of the war. A few cases of diseases of the respiratory system are found—colds, bronchitis, and an occasional pneumonia—contracted through exposure in fording rivers, exhaustive marches, and bivouacking on wet ground, a few more of typhoid (I saw only three in Manchuria), occasionally one of dysentery, and a number of cases of beri beri, that former scourge of oriental armies.

But of all the many thousands gathered in these institutions there were but

*Abstract of an address to the National Geographic Society, December 9, 1904. Those desiring further information on this subject are referred to Dr Seaman's instructive book recently published by D. Appleton & Co.

a few medical cases, and of these scarcely a baker's dozen came under the heading of "Diseases of the digestive system." Therein lies one of the greatest secrets of the Japanese success. Napoleon never made a more truthful statement than when he said: "An army fights on its belly." The Japanese have that belly, and they take good care to keep it in fighting order, not by insulting it three times a day by cramming it with material totally unsuited to the soldier's necessities, thereby exciting irritations and disease, but by supplying it with a plain, palatable, easily prepared and easily digested ration that can be thoroughly metabolized and converted into the health and energy that make its owner the ideal fighting machine of the world today.

The organization of the medical department of the Japanese army and navy is modeled after that of the Germans, with many added improvements. Too much praise cannot be bestowed upon the medical department of the army and navy for their splendid preparatory work in this war. The Japanese are the first to recognize the true value of an army medical corps. The medical officer is omnipresent. You will find him in countless places where in an American or British army he has no place. He is as much at the front as in the rear. He is with the first screen of scouts with his microscope and chemicals, testing and labeling wells so the army to follow shall drink no contaminated water. When the scouts reach a town he immediately institutes a thorough examination of its sanitary condition, and if contagion or infection is found he quarantines and places a guard around the dangerous district. Notices are posted, so the approaching column is warned, and no soldiers are billeted where danger exists. Microscopic blood tests are made in all fever cases and bacteriological experts, fully equipped, form part of the staff of every divisional headquarters.

The medical officer is also found in camp, lecturing the men on sanitation and the hundred and one details of personal hygiene—how to cook, to eat, and when not to drink, to bathe, and even to the direction of the paring and cleansing of the finger nails to prevent danger from bacteria. Up to August 1, 9,682 cases had been received at the reserve hospital at Hiroshima, of whom 6,636 were wounded. Of the entire number up to that time only 34 had died.

It is the rule of the Japanese surgeons at the front to do little or no operating except in cases of extreme emergency or where hemorrhage threatens immediate death. All cases are treated by the application of the first aid dressing and then sent to the rear as quickly as possible, thence by hospital boat or transport to the base hospitals in Japan.

If the testimony of those conversant with the facts can be accepted, supplemented from my own limited observations, the loss from preventable diseases in the first six months of this terrible conflict will be but a fraction of 1 per cent. This, too, in a country notoriously insanitary. Compare this with the fearful losses of the British from preventable diseases in South Africa, or, worse, with our own losses in the Spanish-American war — where, in a campaign the actual hostilities of which lasted six weeks, the mortality from bullets and wounds was 268, while that from disease reached the appalling number of 3,862, or about 14 to 1, or 70 per cent—1 per cent against 70 per cent.

Naturally one asks, Were these results anticipated? As an answer, the statement of a distinguished Japanese officer, when discussing with me the subject of Russia's overwhelming numbers, is pertinent. "Yes," he said, "we are prepared for that. Russia may be able to place 2,000,000 men in the field. We can furnish 500,000. You know in every war four men die of disease for every one who falls from bul-

lets. That will be the position of Russia in this war. We propose to eliminate disease as a factor. Every man who dies in our army must fall on the field of battle. In this way we shall neutralize the superiority of Russian numbers and stand on a comparatively equal footing."

Japan is the first country in the world to recognize that the greatest enemy in war is not the army of the invader, but of a foe more treacherous and dangerous—preventable disease, found lurking in every camp.

If wars are inevitable and the slaughter of men must go on—and I believe wars are inevitable and that most of them are ultimately beneficial—then, for the love of God, let our men be killed legitimately, on the field, fighting for the stake at issue—not drop them by the wayside by preventable disease, as we did in the Spanish-American war—1,400 for every 100 that died in action. It is for the 1,400 poor devils who are sacrificed—never for the 100 who fall gallantly fighting—that I offer my prayer.

The state deprives the soldier of his liberty, prescribes his exercises, equipment, dress, diet, the locality in which he shall reside, and in the hour of danger expects him, if necessary, to lay down his life in its defense and honor. It should therefore give him the best sanitation and the best medical supervision that the science of the age—be it Japanese or Patagonian—can devise.

HELPING THE FARMERS

In the January number of this Magazine considerable mention was made of the work of the Department of Agriculture during 1904. The following paragraphs give information on certain lines of work which were not then described for lack of space.

RECLAMATION OF ALKALI LANDS

THE Secretary of Agriculture reports much progress made during 1904 on the alkali reclamation tracts established during the year previous, and indications point to the complete reclamation of the lands under experimentation at an early day. At the inception of the work on a 40-acre tract near Salt Lake City, a soil survey showed the first 4 feet of soil to contain more than 6,650 tons of soluble salts. In May, 1903, eight months after, there had been removed by drainage nearly 50 per cent of this immense total, and in the following October only 1,221 tons remained in the entire tract. The progress of similar work on a 20-acre tract at Fresno, Cal., has been no less gratifying. The Secretary declares his full confidence in the final success of this work and a firm belief that it will lead to individual or concerted action on the part of those most interested, with the result of greatly benefiting both the agricultural and stock-raising interests.

GROWTH OF CUBAN SEED TOBACCO

In the line of tobacco investigations which are carried on by the Bureau of Soils the most important work during the year was the experimental growing of Cuban seed tobacco on certain soils in Texas, Alabama, and South Carolina. Samples of tobaccos grown in 1903 were submitted to the trade, and the Texas leaf was found to have considerable merit both in regard to flavor and aroma. Some have pronounced it to be superior to any filler yet grown in this country. The Alabama filler leaf is considered fair. Final judgment of the success of this venture, however, must await further advices from dealers and manufacturers. Growing of the

Cuban type of filler has also been tried in Ohio. The most important work in Ohio, however, has been the further introduction of the bulk method of fermenting cigar tobaccos. Over 655,000 pounds were fermented in 1902, over 4,000,000 in 1903, while in 1904 the quantity so fermented exceeded 10,000,000 pounds. Considerable demand has been made the past year upon the Bureau to assist the growers of the heavy export types. Experiments have been undertaken to grow the tobacco with different fertilizers and under different methods of culture to see which will give the best financial results. It is yet too early to give the results of the present season's work.

SHADE-GROWN TOBACCO

In 1903 the Department of Agriculture had practically ceased its work in Connecticut in the production of shade-grown tobacco, but in 1904 it conducted an experiment at Tariffville, Conn., where a crop has been produced on a 4-acre plat. Tobacco of this type was exhibited at the Louisiana Purchase Exposition and received a grand prize as a leaf of the highest excellence for cigar wrappers. The Secretary presents a table which shows that 134 bales of Connecticut shade-grown tobacco have been sold for domestic use at an average price of $1.26 plus, the highest price obtained being $1.75 per pound for light wrappers. One hundred and forty-four bales were sold for export at an average of $0.34.

EXPERIMENTAL WORK IN COMBATING THE COTTON BOLL WEEVIL

The most important work of the Bureau of Entomology during the year has been its combat with the Mexican cotton boll weevil. Under the provisions of the special appropriation of $250,000, made available January, 1904, this work was greatly enlarged. Over a thousand acres, divided among thirteen experimental farms, were devoted to experimental work, and it is believed that the cultural system these farms were designed to illustrate has so far proved to be the only practicable means of controlling the weevil. This is the outgrowth of several years of experimentation.

COLONIZATION OF THE GUATEMALAN ANT

The discovery of the Guatemalan ant and its colonization in Texas is a feature of distinct encouragement. The eminent danger of the spread of the weevil, however, to other States indicates the necessity of continued active and energetic work on the part of the general government.

MEANS OF COMBATING THE BOLLWORM

Field experiments have demonstrated that the cultural system of control recommended for the boll weevil furnishes the very best means also against the bollworm. Spraying and dusting with arsenical potions and the value of truck crops have been made the subject of careful experiments, and the department is now able to recommend measures which will greatly reduce damage from this pest.

BENEFICIAL INSECTS

The possibility of keeping injurious insects in check by the introduction of their natural insect enemies is a popular subject with fruit growers and farmers, and notable success has been achieved in this direction.

STUDY OF INSECTS DAMAGING FORESTS

The general information gained from the study of insects damaging forests, carried on both in the field and in the laboratory, has greatly advanced the knowledge of forest insects and the means of controlling them. An expert has been placed in charge of investigations of insecticides, and fumigation

experiments with fruit stock and buildings and granaries are now under way, as well as coöperative work between the Bureaus of Entomology and Chemistry on the composition of insecticides.

BIOLOGICAL SURVEY

The work of the Biological Survey has been continued along three principal lines: First, investigations relating to the geographical distribution of animals and plants, including biological surveys and the determination of the life and crop belts; second, investigations of the economic relations of birds to agriculture; third, supervision of matters relating to game preservation and protection and the importation of foreign birds and animals. In carrying out this threefold mission the Biological Survey is divided into three sections—that of geographical distribution, that of economic ornithology, and finally one of game protection and introduction.

IMPORTATION OF BIRDS AND MAMMALS

Constant vigilance is necessary to prevent the introduction into the United States of birds or animals likely to become pests. The permits issued during the year numbered 318, and included 1,470 mammals and 250,000 birds.

ENFORCEMENT OF GAME LAWS

Six convictions for illegal traffic in game were secured during the year under the Lacey act, making 42 convictions secured in cases passing through this department. In Alaska the game law has accomplished two main objects—the shipment of deer heads has been stopped, and the export of heads of big game as trophies has been curtailed.

PUBLIC ROAD INQUIRIES

Object-lesson roads have been constructed with the coöperation of the office of public road inquiries in Arkansas, Ohio, Tennessee, Virginia, and West Virginia. These were mostly first-class macadam roads. It has also coöperated at several points in the South in constructing experimental roads of a mixture of sand and clay. In the absence of stone and gravel, this mixture may be used to great advantage. Much has been accomplished during the year in the development of good roads by the state-aid plan. The main features of this plan as now adopted in several states are a state highway commission, appropriations from the state treasury to pay a portion of the expense, the balance being divided between the counties, towns, and the owners of property along the improved roads. Since 1890 eleven states in all have provided, in a greater or less degree, the state aid.

Much time has been spent in studying the physical properties of clays in an endeavor to devise methods by which they can be utilized in road making. Of 228 samples of road materials reported during the past year, 35 were clays. Clinkered clay has been successfully used for some time past as a railroad ballast. Experiments were made with samples of the so-called gumbo clay from the Yazoo district of Mississippi, and following these experiments the Office of Public Road Inquiries built an experimental road in Yazoo City, which has been reported successful. The Division of Tests has not confined itself to investigations of clays in their use as road material, but to their useful properties for any purpose, with a view to developing the use of native clays, of which the production already exceeds $2,000,000 annually, while of foreign clays over $1,000,000 worth are imported.

OILS AND ASPHALTUM FOR ROADS

The suggestion of the Division of Tests to road builders throughout the country to make experiments with mixtures of crude oils and crude asphaltum in road building has resulted in some cases very satisfactorily.

A SCHOOL FOR ROAD BUILDING RECOMMENDED

In connection with the subject of road materials the Secretary of Agriculture urges the desirability of a school for road building in connection with the department, the students to consist of men who have already received degrees from reputable engineering schools.

EXPERIMENTAL WORK IN ALASKA

Many interesting experiments have been carried on in Alaska. Distribution was made, moreover, of vegetable and flower seeds to some 1,500 persons, many of whom report success, and confirm the possibility of raising hardy vegetables in nearly all parts of the territory south of the Arctic Circle. In general, the experimental work in Alaska has shown that live stock could be successfully maintained at many points. Sheep raising has not proved successful, and the Secretary expresses the opinion that Alaskan grass lands as a whole can be most profitably used at present through dairying. The Secretary says it is doubtful if equally good opportunities for dairymen can be found in the United States today.

PUBLICATION WORK

The publication work of the department is a faithful reflex of its activity and growth. The number of publications issued during the past year aggregated 972, of which 379, comprising 23,000 pages of matter, were new. The number of copies of all publications printed during the year amounted to nearly 12,500,000. Of farmers' bulletins, of which 6,500,000 copies were issued during the year, nearly 5,000,000 were distributed upon the orders of members of Congress. Educational institutions are becoming more frequent applicants for publications, mainly for class work, and the Secretary suggests a plan by which, with the approval of Congress, unused congressional quotas of the department's publications might be made available.

From David Griffiths, U. S. Department of Agriculture

A Flock of Goats on the Ranges of Arizona

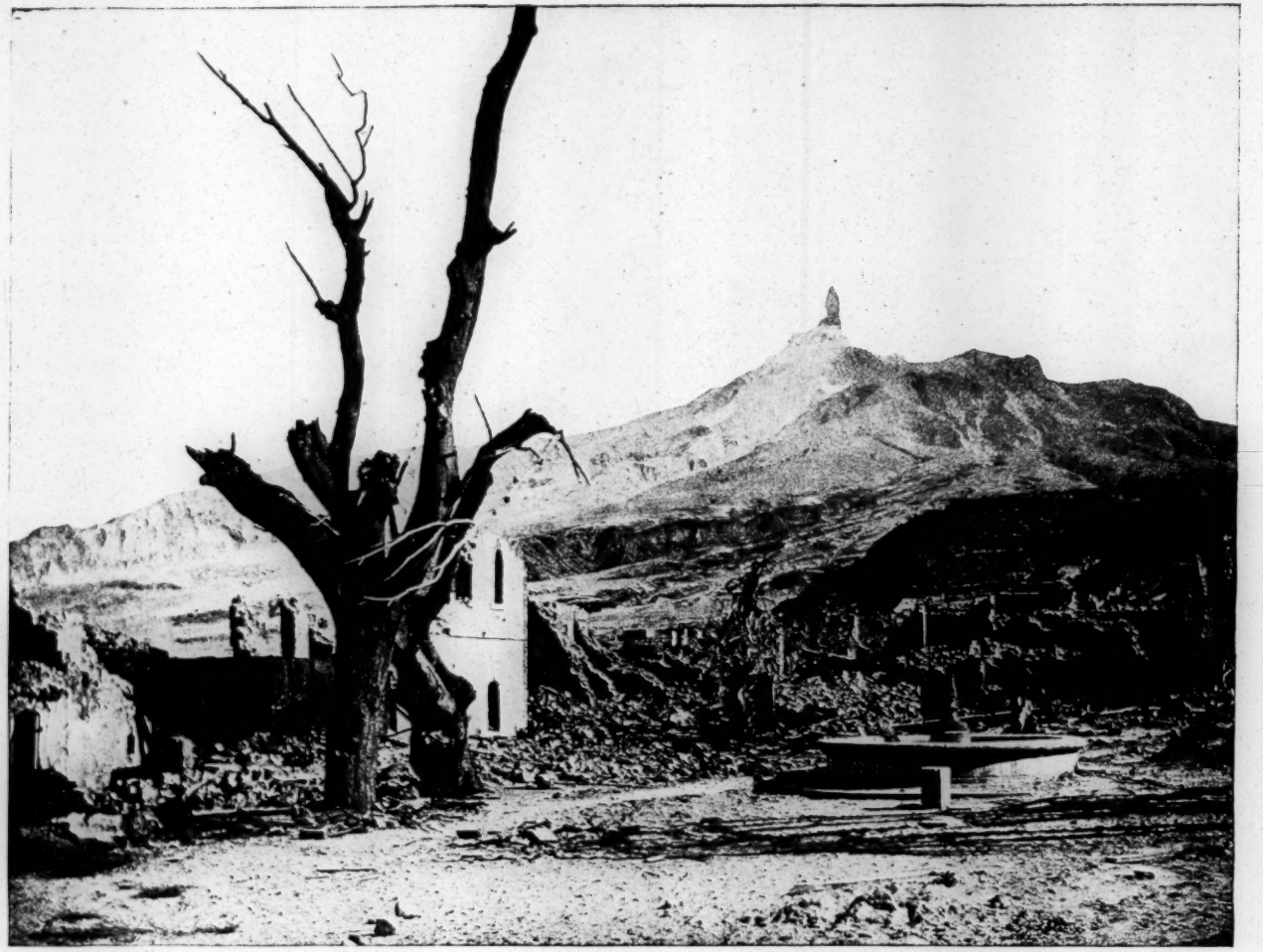


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Photo by Angelo-Heilprin

Pelée, with Its Terminal Tower or Obelisk

As seen from the southern section of St Pierre (looking north-northeast, and across an interval of about five miles). Height of obelisk about 850 feet. Total height of the mountain, including obelisk, somewhat over 5,000 feet. From "The Tower of Pelée." By Angelo Heilprin. J. B. Lippincott Co. (see page 89).

GEOGRAPHIC NOTES

NATIONAL GEOGRAPHIC SOCIETY

THE annual meeting of the National Geographic Society was held at Washington, January 13. Eight members of the Board of Managers were elected to serve for the three years, 1905–1907, as follows:

Alexander Graham Bell, Alfred H. Brooks, Henry Gannett, General A. W. Greely, Gilbert H. Grosvenor, Angelo Heilprin, O. H. Tittmann, and General John M. Wilson.

Prof. T. C. Chamberlin, of the University of Chicago, was elected to fill the vacancy in the Board caused by the resignation of Prof. Wm. M. Davis, of Harvard University.

The report of the Secretary, Hon. O. P. Austin, showed that the present membership of the Society is 3,400, of whom 1.125 are residents of Washington and 2,275 distributed throughout the United States, Alaska, Philippines, Europe, Asia, and Africa. The net gain in membership for 1904 was 789. During 1904 the Society held 12 scientific meetings, 16 special meetings, and 4 field meetings.

At a meeting of the Board of Managers January 27 Dr Willis L. Moore, Chief of the U. S. Weather Bureau, was elected President of the Society. Dr Moore has been actively identified with the Society for many years, serving on the Board of Managers since 1899. At the same meeting Mr Henry Gannett, Geographer of the U. S. Geological Survey, was elected Vice-President. Mr Gannett was one of the incorporators of the Society, in 1888, and with the exception of the year 1903, which he passed in the Philippines, he has served continuously on the Board since the Society was founded.

CHART OF THE WORLD

THROUGH the courtesy of the Hydrographic Office of the Navy Department, and more particularly of Captain H. M. Hodges, hydrographer, and Mr George W. Littlehales, the NATIONAL GEOGRAPHIC MAGAZINE publishes as a supplement to this number a chart of the world on Mercator's projection, showing the submarine cable lines and their connections and ocean routes. Cable and telegraph lines are printed in red and ocean routes in blue. The latest cable lines are shown—as, for instance, the Alaskan cables of the U. S. Signal Corps and the wireless connection across Norton Sound. The tables of distances printed on the bottom of the chart will doubtless be found very convenient by many. One table tells at a glance the comparative distances of New York and Shanghai, or Yokohama by the Panama, Suez, and Cape of Good Hope routes. Another table gives the distances of our Gulf ports from the Atlantic end of the Panama Canal (Colon), and also from each other. The chart can be easily detached from the Magazine and hung on the wall for more convenient use.

NOTES ON THE PHILIPPINES

ONE of the most striking facts in the report for 1904 of Col. Clarence R. Edwards, U. S. Army, Chief of the Bureau of Insular Affairs, is the statement that only $5,300,000, or less than 8 per cent, of the $69,000,000 worth of goods entering and leaving the Philippine Islands in 1904 were carried in American bottoms. What a lamentable instance of the insignificance of our merchant marine, which, like our iron, coal, and agricultural industries, ought to be the greatest in the world.

During the year nearly 13,000 Americans went to the Philippines with the intention of making their permanent home there. Most of them did not specify the nature of their occupation, but among those who did were 333 teachers, 117 engineers, 50 physicians, 47 clergymen, 33 lawyers, 406 clerks and accountants, 186

merchant dealers and grocers, 58 mariners, and 18 miners. Many of these had received civil-service appointments from the United States. The administrative acts of the Bureau during 1904 were previously described by Colonel Edwards in the NATIONAL GEOGRAPHIC MAGAZINE of June and July.

"The question of labor in the Philippines has ceased to be a critical one, says the Collector of Customs for the Philippine Islands in his report for 1904. Despite the gloomy predictions of many thoroughly sincere investigators and writers on the subject, the Filipino laborer has conclusively demonstrated that he is a practicable and dependable element in the industrial development of the Islands. In the past two years several immense enterprises have been successfully carried on solely with the aid of Filipino laborers. All goods arriving at or leaving the port of Manila are handled by natives. During the past year the operation of the customs 'Arrastre plant' has been entirely in the hands of native labor, including the steam tramway and four large steam cranes.

"The Filipinos make good clerks, copyists, typewriters, sub-inspectors, and, in some instances, excellent fiduciary officers. In the handling of cash, in subordinate positions, they have shown a high degree of accuracy and integrity. As marine officers and engineers, especially in the latter position, they have exhibited a skill, fidelity, and courage which entitle them to unstinted admiration."

TRANSPORTATION IN ENGLAND

AT the present time, when there is so much comment on transportation rates in the United States, the following statements from an American consul in England of conditions in that country may surprise some of us:*

*W. P. Smith, U. S. consul Tunstall, England, Consular Reports, January 25, 1905.

"The carriage for a ton of apples from Folkstone, on the south coast of England, to London, is $5.86, while goods of the same class are carried from California to London for $3.81. It costs $9.73 to send a ton of British meat from Liverpool to London, while it costs only $6.09 to send a ton of foreign meat to the same market. The Irish farmer who wants to get his produce to London has to pay $22.88 carriage per ton on his eggs from Galway, while the Danish farmer can send eggs into the London market for $5.85, the Russian for $5.10, and the farmer in Normandy for $4.05. The man down in Kent, who is almost at the London market, has to pay $6.10 per ton to the railway companies for carrying the produce of his orchard to London, while the same class of freight is brought from Holland for half the money."

TO OBSERVE SOLAR ECLIPSE

REAR Admiral C. M. Chester, superintendent of the Naval Observatory, has submitted a recommendation for provision for a naval expedition in 1905 to observe a total solar eclipse. He proposes to select an observation station among the high hills bordering on the Mediterranean, to work with some ship as a base near Valencia, and another station in the uplands, with headquarters on board a vessel on the northeast coast of Spain.

Ranges of Arizona.—David Griffiths is the author of a recent bulletin published by the Department of Agriculture, describing the ranges of Arizona and the measures necessary for their protection. The ranges can carry without injury one horse or cow to 50 or 100 acres. The range-owners have lately begun goat-raising with considerable profit. The picture on page 85 shows a flock of goats on one of these ranges. Excessive stocking has been destroying the value of the ranges.

GEOGRAPHIC LITERATURE

The Tower of Pelee. By Angelo Heilprin. With 23 full-page plates. Pp. 62. 9½ by 12½ inches. Philadelphia: J. B. Lippincott Co. 1904. $3.00 *net.*

This exceedingly handsome volume is a supplement to "Mont Pelée and the Tragedy of Martinique," published by Professor Heilprin in 1902. In it the author discusses the peculiar spine or obelisk which was thrust up the throat of Mont Pelée in 1903, rising to a height at times of nearly 850 feet, and which has since entirely disappeared. The series of views of this obelisk taken by Mr Heilprin and published in the volume are remarkably fine. One of them is republished in this Magazine on page 86. Mr Heilprin also publishes several pictures of glass water bottles and wine glasses which show marked deformations of substance without breakage. "There are no indications of glass flow, and the only apparent change that the glass has undergone is an acquired murkiness. The substance had evidently yielded to pressure impacts at a time when it was subjected to and softened by great heat. This condition sufficiently explains the similar condition of objects found at Pompeii, and does away with the necessity of assuming that the deformation was the result of a slow and steadily progressing molecular change whose workings extended through centuries (!)" Mr Heilprin believes that Pompeii was destroyed in very much the same manner as St Pierre and not, as has been generally assumed, by "simple incineration."

A Naturalist in the Guianas. By Eugène André, F. R. G. S., F. Z. S., M. S. A. With 34 illustrations and a map. Preface by Dr J. Scott Keltie. New York: Charles Scribner's Sons. 1904.

This is a real book by a naturalist and explorer of the old type, and from preface to conclusion is full of vivid and sharply drawn pictures. To any one who loves the solitude of the forest or who has felt the charm of the tropical jungle the book must appeal in the same way that Belt's "Naturalist in Nicaragua" or Bates' "Travels on the Amazon" have for many years fired the imagination of the youth of America and England; but to the writer the book has an additional reality and an indescribable fascination, for it describes the travels and ghastly hardships of a friend.

In 1899, while traveling with Mr Barbour Lathrop, of Chicago, I met the author in the Port of Spain, and I shall never forget the enthusiasm with which Mr Lathrop announced the discovery of this unusual naturalist. We traveled with him later from La Guayra to Panama, and the last time I saw him he was running home a charge in his muzzle-loader after a shot at some gorgeous Colombian song bird.

To the public at large South America is a puzzle. It reads of the great industrial and railway development of the Argentine, of the immense waterway of the Amazon, of the beauties of Rio de Janeiro, and of the ancient Inca civilization of Peru, but there is a silence in the popular literature regarding the immense center of the continent, to which these civilizations of the Argentine, Chili, Peru, and Venezuela form the merest fringe. Eugène André has pushed his way along the watercourses and through the jungles of this greatest of all unexplored tropical regions of the world, and this book which he has written gives a picture of the extreme discomforts, the real hardships, and the frightful exposure to disease and starvation which attends the work of exploration in the uninhabited tropical forest. To a boy familiar with the popular literature on tropical forests nothing could be more delightful than to make one's way, with hunting outfit and canoes, from Rio to Panama, living on the game and the fruits of the forest. André's account of

his explorations dispels any illusions of the luxury of travel in tropical forests and makes the hardships undergone by Wallace in the Aru Islands or by Schweinfurt among the Naim Naim people of Central Africa seem insignificant.

The book describes two expeditions, in 1897–1898 and 1900–1901, from Trinidad up the Orinoco toward the headwaters of the Caura, with side trips up the Nichare and cross-country expeditions cut through the forest to Mounts Turagua and Améha, two of those remarkable mesa-like mountains which are characteristic of southern Venezuela. It is a narrative of daily experiences and observations and sparkles with that humor which is a necessary quality of a good explorer. The observations on animals and plants are unusually vivid and interesting and written with care, yet nowhere prosaic. His ability to take the reader into his confidence and to picture the trials of a naturalist in the tropics may be illustrated by the following:

"If the hornets pay attention to the person of the collector the ants devote themselves to looking after his collections, so that what with having to dodge a being with wings and a sting who means business when he has made his mind up, and trying to devise ways for keeping his property out of the way of an insect that can find a grain of sugar in a stack of hay, the amateur naturalist acquires his first real knowledge of the powers of those so-called lower forms of life."

It were beyond the province of a review to enter in any detail, but as I run over the pages of my friend's book, to collect the materials for which has twice almost cost him his life, certain of his observations seem most worthy of attention. His observations on the healthfulness of Ciudad-Bolivar, situated on the edge of a swamp into which all the village refuse is dumped, those regarding the Indians' confirmative belief in the mosquito as a carrier of the malarial fevers, and the presence of malignant ulcers in certain localities, reminding one of the Bagdad boil, have a bearing upon recent medical researches. His descriptions of the parasol ants, *Oecodoma*, and the manufacture of their fungus gardens remind one of Belt's historic descriptions. His remarks regarding the power of insects to locate at a distance the objects of their desires and make straight for them is as interesting as anything Maeterlinck has written about the bee.

The ichthyologist will find valuable observations in the book on the strange cannibal fishes of the Caura, and laugh at the antics of the alligator disturbed by the explosion of a dynamite cartridge in its particular pool. The rubber experts will read with interest of the forests of a new rubber tree discovered on the Nichare, a branch of the Caura, and of the Indian method of tapping the rubber tree in this region. Those who know the cumarin perfume of the Tonka bean will be interested to learn that these forests furnish the world with the sweet-smelling bean, and that their collection is a lucrative business. The geologist will find enough of interest in André's descriptions of the formations of the rocky canyons and river bottoms of the Caura and mesa-like mountains to hold his attention. The ornithologist will find described and pictured in cromolithographs at least two rare gorgeous tropical birds and mention of the habits of many other new species, while those ladies who wear egrets without a thought of where they come from will get from these pages the scolding of an ornithologist for assisting in the extinction of the beautiful tropical birds from which at their death the graceful egrets are plucked. The exciting part of the book to the average reader, however, begins in chapter XVIII with a description of the wrecking in the rapids of the boat containing all the provisions, clothes, tools, and note books of the party. From this point on, the center

of interest changes and fastens upon the hardships of this little band of almost naked men in their weary marches through the tropical jungle. Without shelter from the tropical rains, with no food but occasional game and wild fruits, with fever-racked and emaciated bodies, and with discontent and mutiny among them, they dragged their way, aided by the remaining small canoe, 200 miles through the forest toward the outskirts of civilization. Twenty-six days can seem a lifetime and proved to all but six of the party of fourteen their closing days.

But it would be a mistake if I were to give the idea that the book is a gloomy account of hardships. On the contrary, it is full of a sparkle of incident and vividness of description that makes it stand out from the commonplace of ordinary works of travel and worthy of a place on the same shelf of honor of a naturalist's library with Darwin's and Humboldt's travels, Wallace's "Malay Archipelago," and Belt's "Naturalist in Nicaragua."

DAVID FAIRCHILD,
Agricultural Explorer.

THE PHILIPPINE ISLANDS, 1493–1898

IT is strange that Messrs Arthur H. Clark Co., of Cleveland, Ohio, have not received better support for their magnificent series of volumes on the Philippine Islands. The history of the islands during the first three centuries after their discovery is buried in letters and manuscripts which were inaccessible until the Clark Co. began their publication under the editorship of Miss Blair and Mr Robertson. As to understand the Filipinos we must understand their complex past, the publication is patriotic as well as enterprising in plan. The publishers have issued the following statement:

"The support accorded our publication, 'The Philippine Islands, 1493–1898,' has been so inadequate that we are facing a serious financial loss upon it. We have issued the work faithfully from month to month, and expect to complete it and fulfill our obligation to those who have supported it, even at a loss to ourselves. Thus far less than 100 sets have been placed in this country, although a larger number have been placed in the important libraries of Europe, India, Australia, the Far East, and the Philippines. Of the sets in this country nearly all are in public institutions; the remainder are in large private collections, which are not likely to come into the market for many years, if ever.

"With much regret we are now compelled to limit the edition to the number of sets actually ordered. Beginning with volume 22, to be published February 1, 1905, only enough of each volume will be printed to fill orders received before that date Of the volumes already issued the excess above the subscribed number will then be destroyed, and the work will never be reprinted.

"The series is the only work making these sources available in any language, and its usefulness and importance to public men, students, and in large private libraries must increase from year to year, particularly when the current volumes cover more recent years and when the index volumes make the sources more easily available.

"Our interest in the islands must grow greater year by year because of the complex oriental problem, the conflicting claims of other nations in the Far East, the Chinese problem and race question, both in the South and Far East, the educational and religious situation, the failure of Philippine tariff systems of the last four centuries, the comparison of Spanish, British, and American colonial policies, etc.

"This set furnishes the final sources indispensable for a proper understanding of these problems. Few subjects are discussed so widely, yet so ignorantly, as matters relating to the Philippines.

"Only seven sets exist outside of public institutions, and all free sets for review must be discontinued."

BOOKS RECEIVED

Along the Nile with General Grant. By Elbert E. Farman. Pp. 339. 8½ x 5½ inches. New York: The Grafton Press. 1904.

Out of the Northland. By Emilie Kip Baker. Pp. 165. 5¾ x 4¼ inches. New York: The Macmillan Company. 1904. 25 cents.

Select List of Books Relating to the Far East. Compiled under the direction of Appleton Prentiss Clark Griffin.

Pp. 73. 10¾ x 7½ inches. Washington: Government Printing Office. 1904.

Excursions and Lessons in Home Geography. By Charles A. McMurry. Pp. 152. 7½ x 5¼ inches. New York: The Macmillan Company. 1904.

Students' Laboratory of Physical Geography. By Albert Perry Brigham. Pp. 153. 7¾ x 5½ inches. New York: D. Appleton & Co. 1905.

The Land of Riddles—Russia of Today. By Hugo Ganz. Pp. 330. 8½ x 5½ inches. New York: Harper & Bros. 1904.

NATIONAL GEOGRAPHIC SOCIETY

THE address on the Philippines previously announced for February 3 has been postponed until after the adjournment of Congress, as it is believed that official demands will then permit the Secretary of War to address the Society on this Subject.

POPULAR MEETINGS

National Rifles' Armory, 920 G street, 8 p. m.

February 3.—"The Evolution of Russian Government." By Dr Edwin A. Grosvenor, Professor of International Law and Modern Government in Amherst College.

February 17.—"Manchuria and Korea." By Col. W. S. Schuyler, U. S. A. Illustrated.

March 10.—"The Panama Canal." Rear Admiral Colby M. Chester, U. S. N., Superintendent of the U. S. Naval Observatory. Illustrated.

March 24.—"The Commercial Prize of the Orient and its Relation to the Commerce of the United States." By Hon. O. P. Austin, Chief of the Bureau of Statistics. Illustrated.

March 31.—"From Lexington to Yorktown." By Mr W. W. Ellsworth, of the Century Company. Illustrated.

April 14.—"Fighting the Boll Weevil." By Dr L. O. Howard, Chief of the Bureau of Entomology. Illustrated.

April 28.—"Niagara Falls." By Dr G. K. Gilbert, Vice-President National Geographic Society. Illustrated.

SCIENTIFIC MEETINGS

Hubbard Memorial Hall, 8 p. m.

February 10.—General subject, "Progress in Animal Husbandry." There will be papers by Mr George M. Rommel, Mr G. Fayette Thompson, and others of the Department of Agriculture, on the work and plans of the Department for producing distinctive American breeds of Horses, on the Angora Goat, the Fat Tailed Sheep, the Barbadoes Woolless Sheep, on the introduction of the Bos indicus, etc.

February 24.—General subject, "The Botanical Investigations of the Department of Agriculture." By Mr F. V. Coville, Botanist, and members of his staff.

March 3.—General subject, "Progress in Plant Physiology." Papers by Dr George T. Moore and others on "Inoculating the Ground," "Protecting Municipal Water Supply Systems," etc.

March 17.—General subject, "Japan."

The Geography of Japan. By Mr Eki Hioki, First Secretary of the Japanese Legation.

The Fisheries of Japan. By Dr Hugh M. Smith.

Agriculture in Japan. By Mr David G. Fairchild.

April 7.—General subject, "Forestry."

Papers by Mr Gifford Pinchot, Mr Overton Price, and others, of the U. S. Bureau of Forestry, and a paper on Japanese Bamboos, by Mr David G. Fairchild.

Office Hours: 8.30 A. M. to 5 P. M. Telephone, North 306

NATIONAL GEOGRAPHIC SOCIETY

Hubbard Memorial Hall
Sixteenth and M Streets, Washington, D. C.

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